THE

TEACHERS' AND PUPILS'

CYCLOPÆDIA

A Popular Dictionary

OF

GEOGRAPHY, BIOGRAPHY, HISTORY, LITERATURE, ECONOMICS, CIVICS, ARTS, SCIENCES, DISCOVERIES AND INVENTIONS

PROFUSELY ILLUSTRATED

EDITED BY

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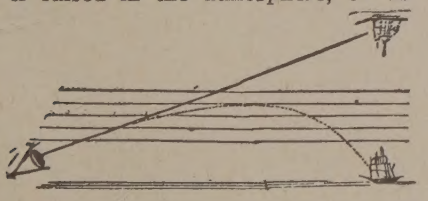
MIRACLE (mĭr'ȧ-k'l), an act wrought by divine power. At present miracles are not thought necessary to show the divine will of God, because we may learn of it in the Scriptures, or they are explained as the result of divine power operating under laws entirely natural but unknown to us. Among the notable miracles recited in the Scriptures are those mentioned in Exodus as the work of Moses when endeavoring to persuade the king of Egypt to allow his people to emigrate, and those mentioned in the four gospels as directly exhibited by Jesus. Christ specifically states the object of miracles by saying, "The works that I do bear witness of me, that the Father hath sent me."

MIRACLE PLAYS, a class of dramatical entertainments whose subjects were drawn from the lives of saints and from the Bible, and which were performed in the Middle Ages. Plays of this character were given as early as the 4th century in the churches by or under the direction of clergymen, but later stages were built in public places of cities on which they were exhibited in public as a means to disseminate religious instruction. Ultimately the miracle plays became corrupted by jests or partook rather of an entertaining than an instructive aspect, on account of which they were abolished for irreverence. The Passion Play is still a noted example, and is performed at Oberammergau, Germany, and elsewhere with much success and good moral results. See **Mysteries.**

MIRAGE (mĕ-rȧzh'), an optical illusion in which images of distant objects are seen as if raised in the atmosphere, or as if



MIRAGE.

inverted. The illusion was first explained by a Frenchman who accompanied Napoleon I. on his expedition to Egypt. He was led to investigate the phenomenon that appeared in the Egyptian desert, which was the source of much annoyance to the French soldiers, who were in several instances led to believe that a lake was really near them, when in fact they were deceived by illusionary images of water. The phenomenon is now known to be due entirely to the rays of light being changed in their direction when passing through colder or hotter strata of air. The layers of air in contact with the surface of deserts become greatly expanded and rarefied, while those immediately above remain more dense, thus causing the rays of light to be bent upward; while the effect above water is usually the reverse, the layers above being warmer than those next the water.

The phenomenon is often seen in the form of one object over another, apparently raising objects above the horizon. It usually appears in a vertical form, but sometimes the images are horizontal. When an object appears to be lifted above its true position, as is shown in the figure, the phenomenon is called looming, and the observer is enabled to see the object, though it really is below the horizon. In looming objects appear either in an erect or inverted position. The difference between looming and mirage is that in the former the reflection is from the sky, while in the latter it is from the surface of the earth. The Fata Morgana is a remarkable phenomenon which appears frequently in the Straits of Messina, and presents objects in the air and at other times in the water. In 1822 Captain Scoresby was sailing in the polar regions and observed in the air the mirage of his father's vessel, which he afterward found to be thirty miles off. Other incidents of seeing ships, armies, men, trees, streams, and other objects apparently near the surface or at some distance in the air are very numerous.

MIRAMON (me-rä-mŏn'), **Miguel**, Mexican soldier, born in the city of Mexico, Sept. 29, 1832; executed June 19, 1867. He descended from a French family, took a course of instruction at the military academy in Chapultepec, and helped to defend that position against the United States army in the Mexican War. In 1852 he entered the army and rose rapidly in rank, becoming general in 1857. He supported the ecclesiastical party against President Alvarez, and succeeded in defending the city of Puebla against a large besieging army. In 1859 he declined an election to the presidency in favor of Zuloaga, who had been deposed from that office, and, after being defeated in a battle against the liberals, fled to Europe in 1860. While there he advocated foreign intervention in Mexican affairs, but later returned to Mexico and gave vigorous support to Maximilian I. as reigning sovereign. It was largely by his persuasion that Maximilian thought it best not to resign, and, after the capture of Miramon by the republican forces, he was shot along with Emperor Maximilian at Queretaro.

MIRIAM (mĭr'i-ȧm), a personage mentioned in the Scriptures as the sister of Moses, and who watched over the cradle of her brother. When the latter was placed in a basket, she is mentioned as coming in contact with the daughter of Pharoah. After crossing the Red Sea her fame as a prophetess and singer of triumphal songs is recounted. She was stricken with leprosy for complaining against the marriage of Moses with a Cushite woman, but later the malady was removed by the prayer of Moses. Miriam died near the close of the

pilgrimage and was buried at Kadesh. Josephus states that she was the wife of Hur and the grandmother of Bezaleel, the architect who designed the tabernacle.

MISHAWAKA, a city of Indiana, in St. Joseph county, five miles east of South Bend. It ranks among the oldest towns of northern Indiana. The surrounding country is productive, and it is the focus of several railroads. Among the manufactures are machinery, flour, farming implements, cigars, and earthenware. It is the seat of several fine schools, and has modern improvements. Population, 1900, 5,560.

MISSION, a term used to designate a station at which missionaries make their headquarters for the purpose of disseminating religious doctrines and winning converts to the faith. The apostles were enjoined by Jesus to preach the gospel and became the first Christian missionaries. They were followed by many Christian teachers and missionaries, who carried the Christian religion to the various parts of western Asia, northern Africa, and southern Europe. Under Constantine, in the 4th century, the spread of Christianity was made a concern of the civil power, and under Charlemagne, in the 9th century, the Saxons became converted. The faith spread rapidly to the various Germanic tribes, who soon sent missionaries into Hungary, Poland, and the Scandinavian countries. The order of Jesuits was established in the Roman Catholic Church in the 16th century, and this order founded missions in South America and eastern Asia. Later the Dominicans, Franciscans, and other orders were organized, under whose direction institutions of learning and industry were instituted.

During the 16th and 17th centuries the Protestant churches attained to a vast membership, and they sent their ministers and missionaries into all parts of the world. At present there are missionaries of all the Christian churches constantly operating in every inhabitable portion of the earth, and large sums of money are spent annually for the purpose of evangelizing heathen nations. Many important missionary societies are maintained in the United States, such as the American Baptist Union, American Board of Commissioners of Foreign Missions, Methodist Episcopal Missionary Society, Lutheran Missionary Union, and Presbyterian Board of Foreign Missions. Besides these are also organizations known as home missionary societies, whose aim is to prosecute religious reform work within the home country. Missionary unions for foreign and domestic activities are now maintained in practically all the leading countries of Europe.

MISSISSIPPI, meaning great water, and also spoken of as the Father of Waters, one of the largest rivers in the world. Its source is in the state of Minnesota, where it issues as a small stream from Elk Lake. It passes through Lake Itasca and a number of others, and thence has a general course toward the south until it flows into the Gulf of Mexico. The entire length of the Mississippi is 2,625 miles, while the Missouri River has a length of 2,920 miles before reaching the Mississippi; thus the combined length of the two rivers is about 5,545 miles. The whole area drained by the Mississippi system is 1,600,000 square miles, and constitutes the most fertile and valuable region in the world. At Minneapolis are the falls of St. Anthony, and there are other localities where fine water power is secured and navigation obstructed, but in many places vast improvements have been made by canals and levees, the latter being constructed to protect portions of the valley from overflowing during high water. The regions subject to overflow are situated south of St. Louis, where it becomes a vast stream of rapidly moving water and carries large quantities of sediment to the gulf. Among the principal eastern tributaries are the Wisconsin, Illinois, Ohio, and Yazoo; and the western confluents include the Des Moines, Missouri, Arkansas, and Red rivers.

At its source the Mississippi is only a few feet wide, but at the mouth of the Ohio it is 4,700 feet, and at New Orleans 3,100 feet, while the maximum volume of water per second during a flood is estimated at 1,500,000 cubic feet. The sediment transported annually is sufficient to cover a square mile to the height of 250 feet. In the upper course the water is clear and transparent, but it gradually grows dark with silt, which it deposits. During the past ages it has carried the land surface far into the gulf and formed a large number of bayous and islands. The government of the United States has caused the construction of jetties to protect the channel for the passage of vessels. The Mississippi River and its tributaries furnish about 16,000 miles of navigable waters, and upon them plies a great interior commerce. There are numerous canals that connect the various rivers and lakes near them, the most important of recent construction being the connection between Lake Michigan and the Mississippi by the Chicago Drainage Canal. Among the important cities on the Mississippi River are St. Paul, Minneapolis, St. Louis, Cairo, Memphis, Vicksburg, Natchez, and New Orleans. De Soto discovered the Mississippi in 1541, and was the first white man to reach it. Marquette and Joliet descended nearly to its mouth in 1673, and La Salle reached the gulf in 1682.

MISSISSIPPI, a southern state of the United States, whose northern boundary is formed by Tennessee, eastern by Alabama, southern by the Gulf of Mexico and Louisiana, and western by Louisiana and Arkansas. Its extent from north to south is 335 miles, width 150 miles, and area 46,810 square miles, about the same as Pennsylvania and Rhode Island. Much of the surface is rolling,

with the highest altitude about 800 feet above sea-level, but there are extensive level tracts along the Mississippi River and at the delta of the Yazoo. The western portion of the state is drained by the Mississippi and Yazoo rivers, and the eastern part by the Pearl, Leaf, Chickasawha, Pascagoula, and Tombigbee rivers. The northeastern corner is touched by the Tennessee River, but only a small portion of the state is drained by it.

As a whole the soil is quite fertile, and in the northeastern part is a region of rich, level prairie land. The coast line on the gulf is ninety miles. Several islands belonging to the state form the Mississippi Sound, which separates the coast from the gulf proper. The state has a climate highly favorable to vegetable growth. Its mean temperature is about 65°, and the average rainfall fifty-four inches. The winters are short and mild, and the summers are made pleasant by healthful breezes from the gulf. Agriculture is the principal occupation. The chief crops are cotton, valued at $45,125,000; corn, $16,500,000; oats, $1,250,000; hay, $1,112,000; potatoes, $500,000; and wheat, $35,000. It also has large productions of fruits, milk cows, other cattle, horses, mules, sheep, and swine.

Mississippi contained extensive forests at the time of its discovery, and it still has valuable areas of timber. Fully 125 species are represented by the various forest trees. The varieties are mostly deciduous, including beech, oak, elm, maple, ash, hickory, willow, cottonwood, walnut, and many other valuable species. Within recent years the production of tobacco, sugar-cane, and many varieties of garden vegetables has received marked attention. The mineral deposits consist principally of brown coal, limestone, and potter's and fire-brick clay. There are valuable fisheries in the gulf and many of the inland lakes and rivers. The manufactures include cotton and woolen goods, machinery, lumber products, cotton-seed oil, leather, agricultural implements, vehicles, furniture, and canned goods. Commercial enterprise is facilitated by the navigation of the Mississippi, Tennessee, Pearl, and Yazoo rivers, and during the high-water period several other streams are navigable for steamboats. Railroads penetrate the state in all directions, the total lines aggregating 3,500 miles. The state also has vast improvements in river navigation facilities, thus making it possible to utilize the many natural resources that abound in the soil and forests.

A system of public schools is maintained by general taxation. More than one-half of the school attendance is made up of colored children. There are efficient high schools in all the towns and cities, which are supplemented by about sixty private secondary schools, and a number of public and private normal schools, colleges, and universities. The schools for colored children are separate, but are maintained by general taxation. The Mississippi University is located in Lafayette county, was founded in 1848, is well endowed, and has a library of 20,000 volumes. At Agricultural College Station is a college of agricultural and mechanical arts for whites, and at Westside one for colored students. The state also gives support to a number of charitable and benevolent institutions, including schools for feeble-minded, deaf and dumb, orphan children, and for unfortunates, and there are also institutions for reformatory and correctional purposes. Among the private institutions may be named the Mississippi College, Clinton; Rust University, Holly Springs; Millsaps College, Jackson; Cooper-Huddleston College, Daleville; and Alcorn Agricultural and Mechanical College. The various civic, benevolent, scientific, and religious societies have a large representation. Of the last named the Baptists are most numerous, and next to them are the Methodists, Presbyterians, Roman Catholics and Episcopalians. There are 225 periodicals in the state, of which eighteen are daily and 195 weekly.

The regions now included in the state of Mississippi were first visited by a Spanish expedition under De Soto in 1540, but no traces of a settlement were left. In 1673 Joliet and Marquette came down the Mississippi, and in 1682 La Salle took formal possession of the region in the name of the king of France. The French settled at Biloxi Bay in 1699, and the territory was ceded by France to England in 1763. It was included within the state of Georgia until 1798, when it was organized as a territory of the United States, and in 1817 was formally admitted as a state. When the Civil War commenced, the state seceded from the Union, and, owing to its location on the Mississippi River, it became the scene of a number of important battles, among them Corinth, Holly Springs, Iuka, and Vicksburg. The war caused the state to lose greatly in population and wealth, but it is developing rapidly its material resources, building cities, extending manufactures, and giving aid to the progress of educational and industrial arts. There are seventy-five counties. It is popularly known as the Bayou State. Jackson is the capital. Other important cities are Vicksburg, Meridian, Natchez, Greenville, Columbus, Aberdeen, Yazoo City, Biloxi, and Wesson. According to the census of 1900 the state has a population of 1,551,270. This includes a colored population of 908,370, or 58.6 per cent., including 905,930 Negroes, 2,203 Indians, and 237 Chinese. Of the entire population 50.4 per cent. are males.

MISSISSIPPI SCHEME, an enterprise promulgated at Paris, France, in 1717, by John Law. The scheme was to develop by colonization the Mississippi valley, and for that purpose a large amount of currency and bonds were issued, which sold at a premium for a long time. The enterprise attracted

the attention of investors from all the civilized countries, but later the stock began to decline and the scheme proved an entire failure. John Law fled from France when the company became bankrupt, in 1720, and soon after the government assumed the obligation to pay the paper currency and the stock issued to shareholders.

MISSOLONGHI (mĭs-sō-lŏn′gē), a town of Greece, situated on the Gulf of Patras, an extension from the Mediterranean Sea. It is memorable as a center for the Grecian revolutionists, and in 1821-22 was held by Marco Bozzaris against Turkish besiegers. In 1824 Lord Byron came to Missolonghi to assist the Greek patriots, but died there the same year. The town is located on a level region, has a considerable trade, and contains fine statues of Byron and Bozzaris. Population, 9,128.

MISSOURI (mĭs-ōō′rĭ), meaning muddy river, the largest confluent of the Mississippi. The source is near the boundary line between Idaho and Montana, where it springs from the Rocky Mountains, and thence has a general course toward the northeast to the northern part of Montana. In the latter state the Missouri flows east, entering North Dakota, and thence has a southeasterly course until it reaches the Mississippi River about eighteen miles above St. Louis. It is 2,920 miles from its source to its junction with the Mississippi, about three-fourths of the distance being navigable. At a point about 400 miles from its source is a gorge 450 feet wide and 1,200 feet deep, known as the Gates to the Rocky Mountains, and 550 miles from its source are the Great Falls, consisting of four consecutive cataracts. The principal tributaries of the Missouri are the James, Yellowstone, Cheyenne, Niobrara, Platte, and Kansas rivers.

MISSOURI, a central state of the United States. It is bounded on the north by Iowa; east by Illinois, Kentucky, and Tennessee; south by Arkansas, and west by Indian Territory, Kansas, and Nebraska. Its length from north to south is 280 miles; width at the northern boundary 208 miles and at the southern 312 miles, and its total area is 69,415 square miles, somewhat larger than all of New England and Delaware. The Missouri River forms the boundary from the northern line to Kansas City, and thence flows across the state. About one-third of the state lies north of the Missouri River. The northern portion is generally a rolling prairie, while the part south of the Missouri is largely hilly and mountainous, including the Ozark Mountains. The general elevation of the state is from 350 to 800 feet above sea-level, but the highest ranges of the Ozark Mountains rise to an altitude of 1,600 feet. Among the various rivers of the state are the Nodaway, Platte, Grand, Chariton, Salt, Osage, Gasconade, White, Black, Little, Meramec, and St. Francis rivers. The mean annual temperature is about 50°, the annual rainfall forty-two inches, and the general climate is both delightful and healthful. The winters are short, summers warm, and winds rarely excessive.

Missouri possesses an abundance of valuable timber, including among the varieties such woods as hickory, oak, ash, elm, maple, locust, cherry, pecan, willow, persimmon, and poplar. Prairies are most abundant in the northern part, but there are fine belts of timber along the streams, and in the southern part the forests cover about one-half the surface. Below St. Louis are numerous swamps along the Mississippi River, and much of the region is subject to overflow during high water. The state has soil of much fertility, its principal products representing an annual value as follows: corn, $45,500,000; wheat, $8,125,000; oats, $4,750,000; hay, $20,250,000; potatoes, $3,115,000. There are also considerable yields of cotton, tobacco, buckwheat, barley, rye, sugar-cane, flax, and many varieties of large and small fruits. Its mineral wealth includes coal, iron ore, copper, lead, zinc, nickel, cobalt, marble, granite, limestone, and fire-clay. The coal fields cover an area of 20,000 square miles, and its supply of iron ore, lead, and zinc is inexhaustible. There are vast manufactures of flour, iron and steel products, cotton and woolen goods, furniture, tobacco products, spirituous liquors, oleomargarine, machinery, and utensils. Excellent transportation facilities are supplied by the Mississippi and Missouri rivers, and there are also vast systems of railroads penetrating the different sections of the state. Its total railroad lines aggregate 7,500 miles. The railroads include a number of the important trunk lines of the United States.

Educationally Missouri is making rapid strides of progress. The state has provided amply for common schools in all sections. Articulated with them are high schools in all the towns and cities, and colleges and universities are abundant. There are five public normal schools for the training of teachers, professional institutions, and a university at Columbia. The university has departments of law, engineering, medicine, mechanic arts, normal training, and metallurgy. It is amply endowed, and has a library of 28,500 volumes. There are also splendid institutions for the care of aged soldiers, the blind, insane, and deaf and dumb, and reformatory and correctional institutes. The private institutions of higher learning are almost innumerable, the list including Washington University, St. Louis; Drury College, Springfield; St. Louis University, St. Louis; William Jewell College, Liberty; Missouri College, Albany; Missouri Wesleyan College, Cameron; Christian University, Canton; Ozark College, Greenfield; College of Christian Brothers, St. Louis; Tarkio College, Tarkio; Pike College, Bowling Green; and Westminster College, Fulton. There are important

religious organizations of all leading sects, of which the more numerous have membership in the following order: Methodists, Baptists, Disciples of Christ, Presbyterians, Lutherans, and Catholics. Of the 1,075 papers in the state ninety-two are issued daily and 800 weekly.

A Spanish expedition under De Soto visited the region included in Missouri in 1541, and Marquette explored some portions in 1673. It was secured to the United States by the Louisiana Purchase. In 1805 the southern part was organized as the Orleans territory, and the northern part as that of Louisiana. In 1812 the Missouri territory was formed, and congress was asked to allow the framing of a state constitution in 1817. An extended controversy regarding the existence of slavery in Missouri arose immediately, which was settled by the famous compromise of Henry Clay in 1820, and the following year it was admitted as a state. The Civil War occasioned much loss of property and life in the state, it being a prolific field for contests between northern and southern interests, but after the war its resources began to be developed with wonderful rapidity, and it now ranks as the fifth state in wealth. Missouri is known as the Bullion State. Jefferson City is its capital. There are 114 counties and many large and prosperous cities. The more important cities, aside from the capital, are St. Louis, Kansas City, St. Joseph, Springfield, Sedalia, Hannibal, Moberly, Carthage, Joplin, Independence, St. Charles, Chillicothe, and Nevada. Missouri ranks fifth in population, being exceeded only by New York, Pennsylvania, Illinois, and Ohio. Its population according to the census of 1900 is 3,106,665. This includes a total colored population of 161,822, or 5.2 per cent. In the state are 161,234 Negroes, 449 Chinese, and 130 Indians. Of the entire population 51.4 per cent. are males.

MISSOURI COMPROMISE, an act of congress passed as a compromise measure to effect a settlement regarding the extension of slavery in the regions beyond the Mississippi River. The act was passed in 1820, and provided that Missouri should be admitted into the Union as a slave-holding state. However, it made the restriction that slavery should never be established in any state to be formed from regions lying north of latitude 36° 30′.

MISSOURIS, a tribe of North American Indians, allied to the Dakota family, and first met with in regions bordering on the Missouri River. In 1805 they settled largely along the Platte River in Nebraska, where they joined the Otoes. At present the tribe includes a large per cent. of Indians who have made considerable progress in educational and industrial arts.

MISTLETOE (mĭz′l-tō), a parasitic plant growing on many varieties of plants, especially on the oak, poplar, lime, ash, apple, and other fruit trees. About thirty species have been described, but the common mistletoe is the best known. It grows to a length of from one to five feet, has a greenish-yellow appearance, and its fibrous roots penetrate into the wood of the tree upon which it preys. Its leaves are oblong, flowers yellowish-green, and it bears yellow viscid berries. The mistletoe is found extensively in the United States and various portions of Eurasia. When young, the mistletoe is succulent, but becomes woody when old. The view held that it is an antidote to apoplexy has long since been abandoned, and its principal use at present is for making bird-lime from the berries. The ancient Celtic peoples of Europe and the Druids regarded the mistletoe with much veneration. It was thought to be effective in the cure of diseases and to constitute a preventive of sickness. Ability to see ghosts was thought to result to those having a plant in possession. There are still many old superstitions regarding the mistletoe in Germany and other European countries, such as kissing under the mistletoe at Christmas as a proof that it is an emblem of love.

MITCHEL (mĭch′ĕl), **Ormsby MacKnight**, soldier and astronomer, born in Morganfield, Kentucky, July 28, 1809; died in Beaufort, South Carolina, Oct. 30, 1862. He graduated with Robert E. Lee and Joseph E. Johnston from the West Point Military Academy in 1829, and served in the artillery until 1832, when he became professor of mathematics in the United States Military Academy. In 1836 he accepted a professorship in Cincinnati College, and in 1844 was made first director of the observatory in connection with that college. In 1859 he became director of the Dublin University at Albany, New York, and at the beginning of the Civil War enlisted for service in the Union Army. He was promoted to the rank of major-general in 1862, and assigned to the department of the south, but died from the effects of yellow fever. Mitchel made many astronomical discoveries, among them that Antares is a double star, and also announced various valuable observations regarding nebulæ. His publications include "Concise Treatise of Planets, Satellites and Comets;" "Planetary and Stellar Worlds," and "Astronomy of the Bible."

MITCHELL, a city of South Dakota, county seat of Davison county, about forty miles west of Sioux Falls. It is at the junction of several railroads, has a growing trade in merchandise, and is surrounded by a fertile country. Among its manufactures are flour, brooms, brick, and machinery. It is the seat of Dakota University, founded in 1885, and has several fine school and church buildings. Population, 1900, 4,055.

MITCHELL, Donald Grant, an author known as "Ik Marvel," born in Norwich, Connecticut, April 12, 1822. He graduated from Yale University in 1841, spent several

years in European travels, and later studied law in New York City. Shortly after he began to write profusely, many of his works having a very wide reading. He became consul at Venice in 1853, retired to a farm near New Haven two years later, and there contributed largely to various periodicals. In 1876 he served as a judge of industrial art at the Centennial Exposition, and at the Paris Exposition of 1878 was a United States commissioner. Though his themes are not profound, yet he was able to blend pensive fantasy with accurate perceptions of life, expressing all in a clear and chaste style. Among his writings are "Dream-life;" "My Farm at Edgewood;" "Out-of-town Places;" "About Old Story Tellers;" "English Lands, Letters, and Kings;" "Fresh Gleanings," and "Reveries of a Bachelor."

MITCHELL, Maria, mathematician and astronomer, born in Nantucket, Mass., Aug. 1, 1818; died June 28, 1889. Her father was a teacher of astronomy, and at an early age inculcated an interest in that branch of study. She assisted him in many of his classes, and soon after began observations of the heavenly bodies. In 1847 she discovered a small comet, calculated its elements, and was awarded a gold medal by the king of Denmark and a medal from the San Marino Republic. Soon after she was employed by the United States coast survey, aided in compiling the "American Nautical Almanac," and in 1857 visited Europe, where she was received with honors by John Herschel, Humboldt, and Leverrier. She became professor of astronomy at Vassar College, Poughkeepsie, New York, in 1865, which position she held until 1888. Many American and foreign associations extended her distinguished honors, and she was awarded degrees by Hanover and Columbia colleges.

MITCHELL, Silas Weir, author and neurologist, born in Philadelphia, Penn., Feb. 15, 1829. His father was a physician and chemist, and exercised care in securing for his son a careful education. Silas graduated at the University of Pennsylvania, and in 1850 secured a degree at the Jefferson Medical College. During the Civil War he practiced in the military hospitals of Philadelphia, where he had charge of those affected by nervous diseases, and later entered upon the medical practice in the same city, giving particular attention to neurology. His study was devoted largely to all classes of nervous troubles and poisons as affecting the system, particularly that of snakes. Several American and foreign scientific societies elected him to positions of honor, and he was for some time president of the College of Physicians. His writings include "Hints to the Overworked;" "In War Times;" "In the Forest;" "Doctor and Patient;" "How to Make Fat and Blood," and "Adventures of Francois."

MITFORD (mĭt'fŏrd), **Mary Russell,** authoress, born in Hampshire, England, Dec. 16, 1786; died Jan. 10, 1855. Her father presented her with a lottery ticket on her tenth birthday which drew $100,000, and this money was spent readily, but not until she had secured a liberal education. Subsequently she began to contribute to the "London Magazine," wrote various plays for the stage, numerous poems, and several essays. The best of these writings were selected and published in "Our Village," a work of five volumes. Her reputation is based principally upon these volumes. They contain a series of sketches of village scenes true to life, which have been republished at various times. Other publications from her pen include "Atherton" and "Recollections of a Literary Life."

MARY RUSSELL MITFORD.

MITHRIDATES (mĭth-rĭ-dā'teez), or **Mithradates,** surnamed The Great, king of Pontus and other countries of Asia Minor. He was born about 133 B. C., succeeding his father as king at the age of thirteen years. After reaching his majority, he began to plan for a successful conquest of Asia Minor. In the war against Bithynia he was supported by the Romans, and soon after conquered the Roman possessions of Asia Minor. Immediately he sent large armies into Greece, but Sulla with a Roman army required him to conclude peace, and he was forced to retreat in 84 B. C. The death of Sulla opened a way for Mithridates to enter upon a second attempt to secure possession of the Roman provinces, but in 74 B. C. he was defeated by Lucullus, and was compelled to retreat from his own possessions into Armenia. Soon after he organized a vast army for a third war against the Romans, and was everywhere successful, recovering most of his former possessions. Accordingly Pompey was sent from Rome with a large force, and, being clothed with absolute power in the eastern provinces, rapidly gathered an army that completely crushed the army of Mithridates near the Euphrates River. Mithridates next proceeded to the Crimea with his army, where a mutiny broke out among his forces, and in a fit of despair he committed suicide in 63 B. C. History gives him a place among the most eminent rulers of Asia Minor. He is spoken of as a man of education and industry, and a patron of learning. Besides being a student of Greek literature, he understood twenty different languages.

MIVART (mĭv'ărt), **St. George,** natural-

ist and author, born in London, England, Nov. 30, 1827. He studied at the Harrow School, King's College, and at St. Mary's College. In 1851 he was admitted to the bar, but later took a medical degree at St. Mary's Hospital, and also at Louvain, France, in 1876. He was successively professor of biology in University College and of natural history at Louvain, securing the latter place in 1890. Several learned societies conferred distinguished honors upon him. His writings oppose the theories of Darwin so far as they relate to the evolution of man, but support many of those bearing upon the operation of development and selection in the lower types. They include "Genesis of Species;" "Origin of Human Reason;" "Man and Apes;" "Nature and Thought;" "Types of Animal Life," and "Introduction to the Elements of Science."

MOABITES (mō'ab-īte̊s), a race of people that inhabited the regions of the Dead Sea and the Jordan River, where they pursued a pastoral life. The Israelites came in contact with them after immigrating into Canaan, and in the time of the judges they exercised superior power over the Jews. David made them tributary about 1025 B. C., but later they formed an alliance with the Chaldæans against the Jews. Their descendants have long since been lost among the Arabs, but there are various monuments of black basaltic granite that have been ascribed to these people. A representative specimen of these monuments was discovered at Dhiban in 1868. It bears thirty-four lines of writing in Hebrew-Phœnician characters. This work of art is thought to date from 900 B. C. Some writers assert that it was erected by the Moabite king Mesha, and contains a record of Moabite wars with the Israelite king Omri and his successors. The monument was broken by natives, but was afterward collected, and the larger part is now in the Louvre at Paris.

MOBERLY (mō'bẽr-lĭ), a city of Missouri, in Randolph county, about sixty-three miles southwest of Hannibal. The surrounding country in rich in stock and cereals, and produces an abundance of coal and hardwood lumber. There are extensive railroad connections, good schools, modern municipal facilities, and manufactures of earthenware, flour, lumber, ice, farming implements, and machinery. The city has large machine shops and is the center of an extensive grain and jobbing trade. Population, 1900, 8,012.

MOBILE (mō-bēl'), a river formed in southern Alabama by a union of the Tombigbee and Alabama rivers. It was so named from the Indians inhabiting that region at an early period of history. There are properly two branches after the union of the two rivers, the east branch being the Tansas River, and the west branch the Mobile. These branches unite and divide several times, and after a course of fifty miles flow into Mobile Bay, an inlet from the Gulf of Mexico.

MOBILE, an important city of Alabama, in Mobile county, on a bay and river of the same name, and forming the only seaport of the state. Its site is on a plain rising gradually from the river. The streets are regularly platted, and many of them are improved by avenues of magnolia and live-oak trees. There are important railroad and steamboat connections, thus making the city one of importance commercially. Its trade is extensive, particularly in tobacco products, lumber, fruits, fish, and oysters. Considerable improvements in the mouth of Mobile Bay have given additional advantages, and regular lines of steamers ply between it and New York, Liverpool, New Orleans, and other American and European trade centers. There are important manufactures of cotton goods, lumber products, furniture, machinery, ironware, tobacco products, earthenware, and utensils. The city has electric lighting, an extensive school system, several educational institutions, and street railways. Before coming into possession of the United States it was successively under French, English, and Spanish dominion, and until 1723 was the capital of the French colony of Louisiana. Its importance as a cotton market has long been recognized, and it is now steadily gaining in its trade advantages. Population, 1900, 38,346.

MOBILE BAY, an inlet from the Gulf of Mexico into Alabama, having a length of thirty miles and a width of from eight to sixteen miles. The mouth of the bay at the Gulf of Mexico is about three miles wide. Its entrance is guarded by Forts Gaines and Morgan, and its depth is from twelve to fourteen feet. Sediments flowing through the Mobile River are tending constantly to make it more shallow, but there have been some improvements to at least partially overcome this tendency. From August 5 to 23, 1864, it was the scene of a naval engagement between the Federal fleet under Admiral Farragut and the Confederate forces under Admiral Buchanan, which resulted in the surrender of Forts Gaines and Morgan and a Union victory.

MOCCASIN (mŏk'kȧ-sĭn), the name of a poisonous serpent of North America, which is found largely in swamps of the warmer regions. It is fish-eating, brown in color with black bars, and attains a length of about two feet. Species of these snakes are found in North Carolina and the country toward the south, and also west of the Rocky Mountains.

MOCCASIN, a kind of shoe worn by North American Indians. It is usually made of deer-skin or some other variety of soft leather, the sole and upper part of which are formed of one piece. The finer grades are ornamented with beads of various colors, and also by fine leather trimming.

MOCKING BIRD (mŏk'ing bẽrd), the

popular name of about twenty species of birds of the thrush family, most of which are widely distributed in North America, the West Indies, and northern South America.

MOCKING BIRD.

The color is ashy-brown above, whitish beneath, and the wings and tail are varied with black and white. Most varieties are found in the warmer regions, but during the summer time they visit the northern parts to breed. Their nests are built near houses, and are formed of grasses and twigs. The parents show considerable bravery in defending the young against cats, snakes, and other intruders. They were named from their ability to imitate the songs of other birds, and such sounds as the quacking of ducks, barking of dogs, and bleating of lambs. At night they do not attempt to imitate, but sing their own natural notes, which are bold, rich, and full, and varied almost without limitation. Several species are able to imitate with exactness the soft notes of the blue-bird and the wild screams of the eagle. In color they differ somewhat. The common mocking bird is about ten inches long, generally ashy-brown in color, and the bill and tail are black.

MODENA (mŏd'ā-nä), a city of northern Italy, located on a fertile plain between the Panaro and Secchia rivers, about twenty-two miles northwest of Bologna. It is fortified by substantial walls, and has well improved streets, but within recent years its development has been rather limited. There are good railroad connections, providing considerable trade advantages. It has manufactures of silk and woolen goods, machinery, ironware, leather, and utensils. Several public buildings date back many centuries, among them the University of Modena, founded in 1678. This institution has advanced courses of study, an observatory, a military school, a botanical garden, and an extensive library. A fine Gothic cathedral is situated there, and a royal palace containing the Este library of 100,000 volumes. The city was built by the Etruscans, but later fell successively into the hands of the Gauls, Romans, Goths, and Longobards. In the time of Constantine the Great it was destroyed, and in 960 it fell to a member of the house of Este, who was proclaimed marquis of Modena. It formed a part of the Cisalpine Republic in 1796, and in 1860 it became a part of the kingdom of Italy. Population, 31,840.

MODICA (mŏd'ē-kä), a city of Sicily, situated thirty miles southwest from Syracuse. It is located in a rocky region, but the surrounding country is among the most productive districts of Sicily, and in its vicinity are valuable rock formations. There is a considerable export trade in wool, soda, butter, cheese, tobacco, wine, and hemp. The city has several fine schools and a cathedral. Population, 38,648.

MODJESKA (mod-jĕs'kạ), **Helena**, noted actress, born in Cracow, Austria, Oct. 12, 1844. She showed much aptitude for stage activities at an early age, but, owing to opposition by the family, her talents were not professionally developed. In 1861 she married an official named Modrzejewska, whose name she retained with a slight modification in spelling, and shortly after joined a company of strolling players. She was left a widow in 1865 and three years later married a Polish patriot and journalist named Charles Chlapowski, and under his influence became the star performer of Warsaw. In 1876 she accompanied her husband to California, where he thought of founding a Polish colony, but soon after she again appeared on the stage in California, and at once entered upon a successful tour of the United States. At the Columbian Exposition she delivered an eloquent address in behalf of Polish independence, on account of which she was officially forbidden to enter Russian territory. Her successes were alike marvelous in the leading cities of America and Europe. Among the roles in which she appeared to the best advantage were as Rosalind in "As You Like It;" Mary Stuart in Schiller's play of that name; Beatrice in "Much Ado About Nothing," and Marguerite Gautier in "La Dame aux Camellias."

HELENA MODJESKA.

MODOCS (mō'doks), an Indian tribe of North America that originally occupied lands in the vicinity of Klamath Lake, California, and who became hostile to the whites as early as 1847. In 1864 their lands were ceded to the United States under an agreement to go on a reservation, but the region set apart for them was not selected until 1871. Treachery on the part of government agents caused them to engage in a warfare against the United States troops, their leader, Captain Jack, demonstrating much ability in strategy and defense. In 1872 they fortified

themselves in the mountains, where they offered stubborn resistance, and in 1873 murdered General Canby and others serving on a peace commission sent to treat with them. Shortly after they were finally quelled, when Captain Jack and other leaders of the rebellion were hanged, and the remainder of the tribe was located on the Quapaw reservation in Indian Territory.

MOFFAT, Robert, missionary, born in East Lothian, Scotland, Dec. 21, 1795; died Aug. 9, 1883. He was sent to South Africa by the London Missionary Society in 1816, landing at Cape Town in the early part of 1817. His field of operation was in Namaqualand, where he was permitted by Afrikaner, a native chief, to establish missions. While there he translated the Bible and a number of standard books into the native tongue, and for a period of several years greatly advanced civilizing influences. In 1842 he published at London his "Missionary Labors in South Africa." A period of more than fifty years was devoted to missionary work, and in 1873 he was presented with a fund of $29,000 by his supporters and friends at London. Subsequently he lectured on African missions at Westminster Abbey. The explorer, Dr. Livingstone, married his daughter Mary.

MOGUL (mō'gŭl), the popular name applied to the sovereigns of the empire founded by the Mongols under Baber, in 1525, which remained a powerful political influence until 1803. The Moguls were descendants of Tamerlane, or Timour, the most noted of the Tartars. Mohammed Bahadoor was the last representative of the Mogul dynasty, being deprived of his title for taking part in the Sepoy mutiny in 1858.

MOHACS (mō-hăch'), a town of Hungary, situated on the west branch of the Danube, twenty-five miles east-southeast of Pecs. It is noted for a battle fought there on Aug. 29, 1526, between the Hungarians and Turks. Louis II. commanded 25,000 Hungarians, but was defeated by 200,000 Turks under Soliman the Magnificent, the Hungarian loss being 22,000 men. On Aug. 12, 1687, a second battle was fought against the Turks by the allied Austro-Hungarian army under Charles of Lorraine, in which the latter were victorious. The town now has good railroad connections, and an important trade in cattle, coal, lumber, agricultural products, and wine. Population, 15,630.

MOHAIR (mō'hâr), or **Camlet**, a fabric made from the hair of the Angora goat and allied species, but there are also wool and cotton fabrics made in imitation. Genuine mohair is made from the fine, white, silky hair produced by the goats of Angora, in Asia Minor, and has long been a valuable article of export from that place.

MOHAMMED (mō-hăm'ĕd), **Mahomet** or **Muhammad**, founder of Mohammedanism, born in Mecca, Arabia, Aug. 20, 570 A. D.; died in Medina, June 8, 632. He descended from a good family of Arabians, but his father, Abdallah, died when he was yet an infant, and his mother, Amina, died when he was six years of age. His early training was for commercial enterprises under his uncle, Abu Talib, with whom he made several tours through Syria and Arabia. In the year 595 he was recommended as managing agent to a rich widow named Khadija, whose business he conducted with such faithfulness that a marriage resulted. This union was particularly happy, and he began to contemplate religious subjects with much earnestness, retiring annually in the month of Ramadhan to a cave in Mount Hara, near Mecca, for solitary study. At that time Judaism and Christianity both prevailed, but paganism had taken a decline. Several Arabs began preaching at Medina and Mecca and thereby laid a foundation for later activities by Mohammed.

MOHAMMED.

When forty years of age, Mohammed announced to his own family that the angel Gabriel had given a revelation to him, and he accordingly began to preach the new religion. His faithful wife, Khadija, and other members of the family were among the first converts, and shortly after Abu Bekr, an influential Arab, also became converted to the new faith. The high standing of the latter persuaded many citizens of Mecca to believe in the apostleship of Mohammed. The new doctrines became known as those of Islam, and Mohammed not only instructed his followers and the people, but from time to time proclaimed divine revelations through immediate contact with the angel Gabriel, and these were later collected and published in the Koran, the sacred writings of this religion. Many of the people looked upon him as a maniac, and when his opposition to the existing religions became more pronounced and effective, he was endangered by public opposition, but his life was saved by his uncle protecting him for three years in a strong castle. During this time he remained in active meditation. His followers were persecuted severely, many of them fleeing to Abyssinia, and, on returning to Mecca in 621, both his wife and uncle died.

Mohammed was reduced to poverty, and retired for a time to the city of Tajf, but soon after resolved to resort to force in the resistance to his enemies. On June 20, 622, he was compelled to flee from Mecca to Medina, the flight being known as the Hegira, and which is the beginning of the

Moslem era. At Medina he was welcomed by a large following, and soon many of his adherents gathered in that city. Shortly after he married the daughter of Abu Bekr, Ayesha, and became recognized as the ruler of the city and the head of several Arab tribes. He not only continued to promulgate prophecies and revelations, but, as his followers increased in number, gave permission to offer armed resistance against infidels, and began to propagate influence by the sword. The long series of battles by which Islamism became established began in 623 at Bedr, where he defeated the Koreish chief, Abu Sofian. On Jan. 13, 624, he defeated a large army at Mecca, where he had gone on the first pilgrimage, and shortly after took possession of that city. He soon gathered a vast army and was recognized as the prince of Arabia by the infidels, but his followers designated him the Prophet of God. There he destroyed the Kaaba idols, made the Black Stone the object of deep veneration by his sacred touch, and instituted at the holy city the historic magnet that attracts vast pilgrimages.

Not only did Mohammed conquer all of Arabia, but he summoned the king of Persia, the king of Abyssinia, and Emperor Heraclius at Constantinople to embrace the new religion. His death occurred in the midst of preparations to conquer Asia Minor and the Roman Empire. It was in the house of his favorite wife, Ayesha, one of several Arabs whom he had married, that life ceased, and the building was afterward made a part of a mosque to which annual pilgrimages are attracted. It is related that in the last moments he called for a pen to indicate his successor, but that this was prevented by Omar for fear he would appoint his son-in-law Ali instead of Abu Bekr. He had several children by his first wife, but Fatima, wife of Ali, was the only one to survive him. Mohammed is regarded generally a man of much intellectual power, keen discrimination, poetic imagination, and extensive knowledge of the Bible and popular legends. Though his book-learning was limited, he yet possessed close acquaintance with the leading accepted views of his time, and was a careful student of men.

MOHAMMED, the name of four sultans of Turkey, the most noted being Mohammed II., who was surnamed The Great. He was born in Adrianople in 1430, succeeded his father, Amurath II., in 1451, and died at Nicomedia in 1481. It had been the object of Turkish sultans for many years to conquer Constantinople, which was the only remnant of the once mighty empire of the Cæsars, and this design was uppermost in the mind of Mohammed. Accordingly he organized an army of 258,000 men and a fleet of 320 vessels, with which he began a memorable siege on April 6, 1453. After persistently attacking the city by land and sea, Justinian was compelled to retire from the ramparts on account of a severe wound, and shortly after Constantine XIII. died. Thus it became possible for the Turks to devastate the capital city, but it was soon after made their own capital, and their possessions were extended to include a portion of Greece, Servia, and Hungary. Mohammed was the founder of Turkish power in Europe. His influence is still felt, for which he is an object of reverence by the Turks. He is glorified as the conqueror of two empires, twenty kingdoms, and 200 cities.

MOHAMMED ALI. See **Mehemet Ali.**

MOHAMMEDANISM (mō-hăm'mĕd-ăn-ĭz'm), the name generally applied by Americans and Europeans to the religious faith established by Mohammed, but which is known among its adherents as Islam, meaning entire submission to the decrees of God. Among the tenets of Mohammedanism are many that are apparently allied to other faiths. Principal among them is that there is but one God; that He is perfect in knowledge, power, glory, and wisdom; that He is the Creator and Lord of the universe, and that He exists eternally without beginning or end. The Koran is held to be the supreme and incorruptible revelation of God which was given to His people through Mohammed. Other Holy Scriptures in a corrupted form include the Psalms, Pentateuch, and the Christian gospels. There are held to be ever-living, perfect angels and evil genii, the former being created of light and the latter of a smokeless fire, but subject to death. At the end of time there is to be a general resurrection followed by a final judgment for future rewards and punishment, both being largely of a physical character. All good and evil events are held to be predestined by God, this view having grown to the extent of fatalism.

It is held essential among Mohammedans to believe in the prophets and apostles of God, the most noted being Adam, Noah, Abraham, Moses, Jesus, and Mohammed, but the last named is not only the greatest, but the most excellent of God's creatures. Those embracing Mohammedanism are required to observe five duties: have faith that Mohammed is the prophet of the only existing God, prayer, fasting, alms-giving, and a pilgrimage to Mecca. Prayer is required at four definite periods each day, and consists of certain adoration and thanksgiving ordained by God and his prophet. Friday is the Sabbath and day of special worship, when all prayers must be said in the mosque. At other times any clean place may be selected for prayer, but in praying the face of the worshiper must be turned toward the Kebla, meaning in the direction of Mecca. The giving of alms depends of course upon the means possessed by the Moslem, each individual being expected to give according to his ability. Fasting occurs particularly in the month of Ramadhan

from daybreak until sundown, the only exemption being those physically unable to abstain from food, and the fasting includes absolute abstinence from all forms of drinking and eating as well as sensual indulgences.

An annual pilgrimage to Mecca is advised, but at least one is a religious duty, and after such prilgrimage the Moslem is designated a Hadji. All forms of intoxicating liquors are forbidden, as well as gambling, sensual enjoyments, and images. On the other hand, veracity, modesty, and piety are commended as virtues. Idol worship is prohibited. Moslems are also forbidden the use of blood and partaking as food of swine or animals dying of disease. Abu Bekr, father-in-law of Mohammed, became the successor of Mohammed in 632. He was succeeded by Omar in 634, and he again by Othman in 644. Shortly after a dispute arose regarding the succession, and Ali, Mohammed's son-in-law, was selected by the Arabs, and Moaviah by the Syrians. From this division arose two Mohammedan sects known as Sunnites ad Shiites. The former are considered orthodox Mohammedans, and the latter hold that Ali was the first and rightful successor of Mohammed. The Sunnites are most numerous in Turkey, Turkestan, Arabia, and Africa, while the Shiites predominate in India and Persia. There are about 250,000,000 Mohammedans in the world. No other faith has offered a resistance as formidable to the advance of Christianity.

MOHAWK (mō'hạk), a river of New York, rises in Lewis county, flows in a southwesterly direction to Rome, and thence flows southeast and joins the Hudson opposite Troy. The river is about 135 miles long, has an abundance of water power, and is paralleled in its entire course from Rome to Troy by the Erie Canal. Among the towns on its banks are Rome, Utica, Cohoes, Schenectady, and Waterford.

MOHAWKS, an Indian tribe of North America, one of the Five Nations of the Iroquois, and originally located in the Mohawk valley. The Dutch secured their friendship in the early settlement of New York, as also did the English, and during the French and Indian War they proved valuable allies to the colonists. In the Revolutionary War they adhered to the British, their chief, Brant, rendering effective services to the latter. The Bible was translated into their language, as well as several prayer books and histories. More recently a grammar and dictionary were written. The tribe includes many representatives of more than ordinary ability. After the Revolutionary War most of the Mohawks settled on the Grand River, in Canada.

MOHICANS (mō-hē'kạnz), or **Mohegans**, an Indian tribe located originally along the Hudson River, and classed with the Algonquin family. The Mohawks compelled them to settle along the Connecticut River in 1628, but later a portion returned to their former possessions, and others went eastward and became known as the Pequots. They were generally friendly to the English in their contests with the French, but later they sided with the Americans. After the Revolution they divided and formed settlements in New York, Wisconsin, and Kansas. Many of the Mohicans have become assimilated by the whites, and are now represented by descendants noted for their educational and industrial skill. The "Last of the Mohicans" is a novel written by Cooper that has made the name famous.

MOLASSES (mō-lăs'sĕz), a brown syrup obtained in refining sugar, which is uncrystallizable and is secured from draining crystallizable sugar. It consists generally of thirty-six per cent. inconvertible sugar, thirty-six per cent. crystallizable sugar, twenty per cent. water, five per cent. organic acids and extractive, and three per cent. mineral matter. Large quantities of cane molasses are produced in the southern states, but sorghum, a form of molasses, is made in all the states. Louisiana takes the highest rank in the production of molasses.

MOLD, the name of any fungus growth on food, clothing, walls, gum, and other substances. The term is applied especially to such growths as form a woolly coating on decaying vegetable matter, or in moist, warm places. Mold is a vegetable growth of a low type.

MOLDAU (mōl'dow), the largest river of Bohemia, having its source in the Bohmer Wald, on the frontier of Bavaria. Thence it flows toward the north and joins the Elbe after a course of 275 miles. The Moldau courses through a fertile region. It is important on account of its fisheries and navigation, and on its banks are the cities of Budweis and Prague. About half of its course is navigable.

MOLDAVIA (mŏl-dā'vẹ-ạ). See **Roumania.**

MOLE, an insectivorous animal having a barrel-shaped body, very broad fore feet

COMMON MOLE.

adapted for digging, and burrows immediately below the surface of the ground in search of insect larvæ and worms. There

are several well-known species, most of which are from five to six inches long. They have small eyes, a velvety fur, and are destitute of external ears. Moles make extensive underground excavations as a central place for their operations, these central places usually having a large number of halls and galleries, and from them the passages proceed in all directions. The central rooms are connected by channels with places where they secure water, and in them they rear their young. The earthworm is the normal food of moles, but they feed greedily on all kinds of flesh, such as mice, frogs, and even small birds. The common mole native to America is distributed from Canada to the gulf, and allied species are found in various parts of Eurasia and Africa. In many localities it effects damage to pastures and lawns, and also injures many varieties of growing plants by disturbing the ground immediately surrounding the roots. The shrew-mole is found largely in North America, and the cape-mole in South Africa. Moles are mammals and increase with great rapidity. From four to six young are produced at a time, twice each year. The adult is about six inches long, of a blackish color, and the tail is one inch long.

MOLIERE (mo-le-êr′), **Jean Baptiste Poquelin**, eminent dramatist, born in Paris, France, Jan. 15, 1622; died Feb. 17, 1673. His family name was Poquelin, and Molière was assumed as the stage name. He descended from a family of tradesmen, received a liberal education, and, after studying law, gave up that profession to follow the career of an actor. His first efforts at Paris were unsuccessful, and accordingly he made an effort in the provinces, where he attained to much popularity. In 1658 he made a second venture at Paris, when he introduced several comedies and later established a theater. In the following year he wrote "Précieuses Ridicules," which embodies a fine satire on the language, dress, and thought of his time, and on the character of learned females. This not only added greatly to his reputation, but also was the cause of several reforms.

Many of the plays given by the theatrical troupe under the direction of Molière were prepared by Racine and Corneille, and he also drew inspiration for his own productions from the literature of Italy and Spain. There was not a year up to 1673 that he did not give to the world gems of literature of much value, some of which have survived and are still popular. In his "Tartuffe" he made an attack upon hypocrisy in connection with religious pretensions, and as a result it was forbidden to be presented for some years, a fact of which rival actors and enemies took advantage. Molière was popular with Louis XIV. That sovereign selected his performances for royal company, and later also pensioned the director. Few names have a brighter luster in the literature of comedy than his. His productions are admired extensively, all of them possessing originality and studied design. He was at first refused burial by the archbishop of Paris because that official regarded him a reviler of the clergy, but permission was granted at the request of the king, and a century after his death a lifelike bust of him was placed in the French Academy. Among his most celebrated productions are "Festival of Peter;" "School for Women;" "Tartuffe;" "George Dandlin;" "Misanthrope;" "Learned Women;" "Le Malade Imaginaire," and "Don Juan."

MOLINE (mō-lēn′), a city of Illinois, in Rock Island county, on the Mississippi River, immediately north of Rock Island. It is connected extensively by railroads, has an abundance of water power, and in its vicinity are deposits of bituminous coal. The manufactures include wagons, machinery, stoves, paper, musical instruments, flour, and farming machinery. It has good schools, pavements, electric lights and street railways, and a free public library. The city has a large trade in produce and merchandise. Population, 1900, 17,248.

MOLLAH (mŏl′lâ), a title applied by the Turks to anyone having acquired position in public worship under the Koran, or attained to respect because of personal purity. Such a title is applied from common habit, and corresponds to the English terms master and excellency.

MOLLUSCA (mŏl-lŭs′kâ), a sub-kingdom of animals embracing a division of the invertebrates. It includes especially those having

ARGONAUT IN ITS SHELL.

an unsegmented bilateral body; four nerve-cords arranged in pairs, two visceral and two pedal, with lateral and medial abdominal ganglia. The division embraces animals known as oysters, cockles, snails, limpets, slugs, and many others. Most mollusks are supplied with shells, but many have a muscular sac, while others have a body quite naked and unprotected. Mollusks of the shell class are known as univalves, bivalves, and multivalves. The limpet is a univalve, and has a shell constructed of a single piece. Many of this class of animals have shells formed like cups, or as if spirally wound on an axis, but they always consist of a single piece. Mollusks of the bivalve class

are so named from the two parts of their shells, which are attached by a hinge, and represented by the oyster and cockle. The shell of multivalves is composed of a number of pieces, but this class is not numerous. In the female of the genus argonauta, or paper nautilus, the shell is remarkably beautiful.

Carbonate of lime is the principal constituent of the shells of mollusks, and with it is a small per cent. of animal matter, the whole being secreted by an interior tegument of soft texture. The different species are variously constructed, though generally the blood is quite colorless; a mouth, gullet, stomach, and intestines constitute the

ARGONAUT SWIMMING.

digestive system; and respiration is effected quite variously. The bivalves and some of the univalves breathe by gills, and in some univalves, as in the snail and slug, there is an air chamber so constructed of organs that the air is breathed directly. Many of the mollusks have an organ of locomotion, which is utilized by a slight opening and protruding from the shell, as in the cockle, clam, and snail. In this way they are able to propel themselves forward by burrowing in the ground. Oysters are unable to move, owing to the foot being rudimentary, while the octopus and cuttle-fish are supplied with locomotive organs in the form of tentacles around the mouth.

Clams, oysters, and mussels are known as acephala, meaning without a head. The nautilus, octopus, and cuttle-fish have two great eyes and from eight to ten tentacles or arms surrounding the mouth. They are called cephalopods, meaning head-footed. There are many thousand species of mollusca that have been studied. They are distributed throughout every clime and nearly every part of the world; the number of species is given at 21,500. There are also fully 20,000 extinct species, their study being possible on account of the reliable means afforded by the comparative indestructibility of the shells when buried in the various strata of deposits formed by the action of water. Some forms of mollusks inhabit fresh water, others the land, and there are large numbers found in salt water. All of the different species of shelled animals leave remains that almost defy decay.

MOLLY MAGUIRES, a secret society organized in 1843 in various portions of Ireland, and whose purpose was to attain advantage by intimidating officers and citizens. In 1867 branch organizations were formed in the anthracite coal districts of Pennsylvania, and these sought to gain advantage in political and financial matters by terrorizing and intimidating their opponents. Detectives operated among them for some time with more or less effect. The organization was finally broken up in 1887 by the execution of twenty members on conviction of murder.

MOLOCH (mō'lŏk), or **Molech**, an idol worshiped among the Ammonites, and later also in Judah. During the Hebrew monarchy its special seat was in the valley of Hinnom, and it is said that children were passed through the fire of Moloch in the reigns of Kings Ahaz and Manasseh. It is thought that children were originally offered as a sacrifice to this idol, but later, when humane sentiment began to displace cruel superstition, the practice gradually became extinct.

MOLOKAI (mō-lō-kī'), one of the Hawaiian Islands, situated north of Lanai, and noted principally on account of its colony of lepers. The island is thirty-eight miles long, about eight wide, and has an agreeable climate. Lepers from all parts of the Hawaiian Islands have been located on Molokai, but the colony is separated entirely from the other portion of the populace. Population, 1900, 2,378.

MOLTKE (mōlt'kĕh), **Helmuth Karl Bernhard, Count von**, field-marshal of Germany, born at Parchim, Mecklenburg-Schwerin, Oct. 26, 1800; died April 24, 1891. He descended from a noted family, secured military training at Copenhagen, entered the Prussian service in 1822, and later studied in the Military Academy. In 1835 he traveled extensively in southern Europe, was retained as an organizer by the sultan of Turkey, and while there effected a complete reorganization of the Turkish army. He took part with the Turkish expedition in Syria against Mehemet Ali and Ibrahim Pasha of Egypt, in 1839, but soon after returned to Prussia. In 1847 he became general commander on the Rhine, and was chief of the general staff at Berlin after 1858, in which position he effected a general reorganization of the Prussian military forces. He witnessed the war between Austria and Italy for the purpose of further reorganizing the German army, and in 1864 sketched the campaign against Denmark. The activities against Austria in 1866 were efficiently planned by Moltke, and he also personally directed affairs at Koniggratz. Later he directed the advance of the Prussian army against Olmutz and Vienna, and for efficient services

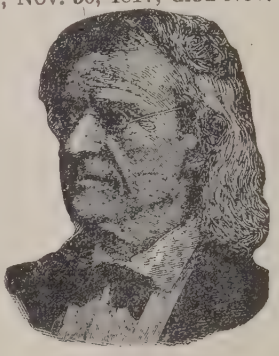
COUNT VON MOLTKE.

received the Order of the Black Eagle. In the war against France he was practically the commander-in-chief, and for the efficient manner in which he planned the campaign was made chief marshal of the German Empire in 1871, and the following year was created count. This illustrious soldier was generally regarded the leading strategist of his time. He received from Russia the Order of St. George and from Germany the Order of the Iron Cross. In 1888 he retired from the chief command of the general staff and was made president of national defense.

MOLUCCAS (mō-lŭk'kąz), or **Spice Islands**, the name applied to a division of the Malay Archipelago, situated between the Philippine Islands on the north, the Sunda Islands on the south, New Guinea on the east, and the Celebes on the west. The entire group includes several hundred different islands, of which the principal ones are Gillolo, Ceram, Booro, Morty, Mysole, and Mangola. There are two divisions: the northern Moluccas and the southern Moluccas, the former being governed directly by the Dutch, and the latter through native sultans or rulers. However, all of the group is a possession of Holland, and is divided into the four residences of Ternate, Amboyna, Banda, and Menado. The area is 45,500 square miles; the population 500,000. Most of the inhabitants are natives, of the Polynesian and Malay races. The islands are of volcanic origin, and contain a number of lofty mountains, but the soil is generally fertile and the climate favorable. They have a considerable trade in live-stock, tropical fruits, valuable timber, fish, beeswax, cloves, birds' nests, nutmegs, tea, and various spices. Among the animal forms are the beautiful birds of paradise, the flying opossum, gorgeous butterflies, corals, and many varieties of birds of song and plumage. The Moluccas were first claimed by the Portuguese in 1521, and in the 17th century they became tributary to Holland. As a whole they are a valuable possession, supplying many useful articles of commerce at small expense. The European population is very small. Earthquakes are of frequent occurrence.

MOMENTUM (mō-mĕn'tŭm), the power of overcoming resistance possessed by a body in motion, and which may be defined as the product of the mass and its velocity. To measure any force we must know what quantity of matter is moved, and what velocity it possesses in a unit of time, the product of the two being the momentum. Thus, a ball of four pounds, moving uniformly at the rate of eighteen feet in a second, has double the momentum of one weighing three pounds and moving at the rate of twelve feet per second, for $4\times18=72$, and $3\times12=36$, or half as much. The momentum of a moving body and the force with which it strikes an object are the same in amount.

MOMMSEN (mom'sen), **Christian Matthias Theodore**, noted historian, born at Garding, Germany, Nov. 30, 1817; died Nov. 1, 1903. He studied at Kiel, traveled in France and Italy to study Roman inscriptions, and was chosen professor of jurisprudence at Leipsic in 1848. In 1852 he became professor of Roman law at Zurich, accepted a like position at Breslau in 1854, and was made professor of ancient history at Berlin in 1858. He was appointed perpetual secretary of the academy at Berlin in 1873, and during his leisure devoted himself with much ardor to historical research and writing. Mommsen is regarded one of the most thorough scholars of recent times; his knowledge of language, mythology, antiquities, law, history, and the sciences is recognized as both extensive and profound. Many of his writings have been translated into Russian, French, Italian, English, and other languages. Among his productions are "Roman History;" "Dialects of Lower Italy;" "Political Rights of Rome;" "Cæsar and the Senate;" "Provinces of the Roman Empire from Cæsar to Diocletian;" "Roman Chronology," and "Historyof Caius Martius Coriolanus."



C. M. T. MOMMSEN.

MONACO (mon'ä-kō), a small principality of Europe, located nine miles northeast of Nice, between the French department of Alpes-Maritimes and the Mediterranean. Subsequent to 1861 the area has consisted of eight square miles, since at that time the prince of Monaco transferred the remainder of the possession to France in consideration of $800,000. The Grimaldi family had possession of this small territory for nearly a thousand years, and its independence has been recognized generally by European powers. Monaco is the capital. It has a population of 3,112, and is noted as a summer resort. The inhabitants of the region are practically free from taxes, since sufficient revenues are raised by the sale of commercial and gambling privileges. The legislative and executive authority is vested in the prince. It has a mild climate, railroad connections, and a considerable trade in aloes, fruit, and cereals. The population of the principality is 12,790.

MONARCHY (mŏn'ärk-ў), a form of government administered by a monarch, and in which the supreme authority is vested in a single person. Monarchies are either absolute or limited. An absolute monarchy is one in which the sovereign has absolute authority, and in him is vested the power to

make, interpret, and execute the law according to his own will. Russia, Persia, China, and Morocco are among the absolute monarchies. A limited monarchy is a government in which the sovereign is restrained by a constitution and established laws, as is the case in Austria, Sweden, Germany, England, and other European countries. In these the power to make laws is vested in a legislative department; the power to interpret in courts, and the laws are executed by the sovereign. A hereditary monarchy is a government in which the sovereign obtains title to the throne by birth, as in England and Germany; and an elective monarchy is one in which the subjects elect a sovereign for life, as was the case in Poland before its partition. The principal terms used to signify the position of a monarch include emperor, king, kaiser, czar, sultan, and shah. In countries recognizing female succession the equivalent feminine appellations, as empress or queen, are applied.

MONASTERY (mŏn'ăs-tĕr-ȳ), an institution occupied in common by individuals under religious vows of seclusion. Persons taking vows of monastic seclusion, or monachism, have been mentioned from periods long before the Christian era. They are still common to the Buddhists and Brahmans, among whom are many individuals who take the vow to practice a life of religious piety as recluses. It is thought that the first Christian monastery was founded in Upper Egypt in 305 by Anthony the Great, who organized the institution by calling around him hermits and held them together by conducting exercises of devotion in common and encouraging industrial enterprises among the members. A monastic colony was founded soon after by his disciple, Pachomius, on the island of Tabenna, in the Nile, which in 348 numbered 7,500 persons. Soon after Christian monasteries spread to the northern shores of the Mediterranean, especially in Italy. In the 6th century St. Benedict introduced monastic vows that led to a spread of learning, piety, temperance, and industry, and from his efforts sprang the influential Benedictine rule, under which strides of advancement were made both in spiritual and physical relations. Much of the early education of Europe was fostered under monasticism, and during the Crusades the monasteries became quite generally independent of all superintendence, except that of the pope. Later such mendicant orders as the Franciscans and Dominicans became factors in education.

After the Reformation the number and influence of monasteries diminished, and in some countries the institutions were wholly abolished. Joseph II. of Germany abolished most of the monasteries in 1781, while those remaining were prohibited from being influenced by foreign sovereigns. France took a like step in 1789, but since 1880 institutions of this character are permitted. In 1875 the monasteries of Germany were limited to those providing for the sick, and various restrictions have been placed upon them in Spain, Russia, Portugal, and Italy. In the United States and many other countries of America there is no restrictive influence, but several of the Catholic countries of South America have either abolished or limited them. The monastic vows include the three obligations: poverty, obedience, and chastity. The vow of poverty places an obligation upon a monk under which he is unable to hold property, though in some of the orders, as the Augustines and Carmelites, a sufficient amount for support may be held by members. On the other hand, the vow of obedience makes it necessary to comply with the established rules of the organization, and that of chastity requires total abstinence from association with the opposite sex.

MONASTIR (mŏn-ăs-tēr'), or **Bitolia**, a city of European Turkey, located in Macedonia, ninety miles northwest of Salonica. It is situated on an important trade route between northern Albania and the Ægean Sea. There are important manufactures of woolen and silk goods, carpets, jewelry, and utensils. At present it is in an illy-kept state, but during the prosperity of ancient Greece it was both substantially built and important as a strategic point, and was known as Pelagonia. The Turkish government maintains a military force at Monastir, and it is also the residence of the governor-general. The inhabitants are chiefly Greeks and Bulgarians. In the city are several fine buildings, including twelve mosques. Population, 45,260.

MONEY, any material that by agreement serves as a common medium of exchange and measure of value in trade. It is quite difficult to devise a definition to describe all the different ways in which money may be used to serve a useful purpose in an economic sense, but it is generally agreed that as a circulating medium it constitutes the standard by which the value of all other commodities is measured; that it is an equivalent for commodities; and that to be utilized as a medium of exchange for commodities it must bear certain marks by which it may be recognized. Various articles have been used among primitive peoples to effect exchange. The earliest system was one of barter, in which one commodity was exchanged for another, but in some regions cattle, shells, skins, feathers, beads, grain, sugar, tobacco, nails, postage stamps, and many other objects were used as money. Many of the semi-savages accepted beads, wampum, and cowries by custom as money at an arbitrary value. Genesis first mentions the use of money in a purchase made by Abraham, when that patriarch secured a field as a sepulcher for Sarah. The coinage of money has been ascribed at an early date to the Corinthians, the Lydians, and the people of

India. It is certain that coins were employed in the 6th century B. C. Paper money came into use in Europe in the 14th century, but it was employed to some extent in Europe at a much earlier date.

The utility of money as a medium of exchange is easily understood. Without it there would be much difficulty in effecting commercial enterprises, and we would have to resort to the barter system recognized by early peoples in exchanging one commodity for another. As a measure of value the quantity of money must be properly adjusted to furnish the best facilities for trade, since the amount in circulation has an important effect upon the industries and the price of commodities. It is certainly true that where the state of society is otherwise perfectly stationary an increase in the volume of money brings about a smaller purchasing power, thus increasing the price of commodities; and, on the other hand, a decrease in the volume has the contrary effect. In addition there must be stability in the value of money, otherwise it might decrease or increase as a valuable possession within a short time. To secure the necessary stability in value it is necessary to have a government organized on a proper and durable basis, or to make the money quite largely of a material representing much value in a small bulk. Paper money depends for its stability wholly upon the government back of it, while coin represents a value aside from the monetary functions which it serves.

Among the necessary elements that should characterize any substance used as a medium of exchange are that it should have value aside from its use as money; comprise much value in small bulk; possess close approximation to constancy of value; be divisible into small portions without loss; possess great durability; be in practically universal use by the leading nations, and possess capability of receiving and retaining stamps to indicate its current value. Both gold and silver have all these characteristics, while all other metals fail in answering the requirements in one or more respects. For this reason both gold and silver are used chiefly as standard money, some countries preferring a bimetallic and others a single or monometallic standard. Besides the principal coin constituted of gold and silver, there is token money for change made of such metals as nickel and copper. It is generally aimed to put a value equal to the monetary value in standard money, while token money is not generally a legal tender for more than small amounts, and represents an exchange value far greater than that of the metal of which it is made. By legal tender is meant that the money possesses attributes which are sufficient to discharge a debt, and token money is usually a legal tender for only a small amount, because it becomes cumbersome when presented in payment of a large obligation.

Paper money is based either upon the credit of the nation or upon coin deposited in the national treasury. The so-called greenback money is an example of the former, and gold and silver certificates of the latter. Both in a system of banking and a national currency it has been found that a small amount of coin is adequate to supply the basis for a much larger system of credit money, for the reason that very few individuals care to exchange the more convenient currency for gold and silver coins. By money unit is meant the representative denomination used in making exchange, which in the United States is the dollar. The franc is the money unit of France, Switzerland, and Belgium; the mark of Germany; the pound sterling of Great Britain; the ruble of Russia; the lira of Italy; the florin of Austria-Hungary; the krone of Sweden, Norway, and Denmark; the milreis of Brazil and Portugal; the rupee of India; the guilder of Holland; the peseta of Spain; the piaster of Turkey; the yen of Japan, and the tael of China.

MONGOLIANS (mŏn-go'-lĭ-anz), in ethnology, one of the five great races of the world. The term was originated by Blumenbach, and when the five races discriminated by him were reduced by Cuvier to three, the latter adopted the name. Among the principal characteristics are a square head, flattish face, flat nose, eyelids obliquely turned up at their outer angle, cheekbones projecting, and the chin quite prominent. The hair is black and straight; the face and body yellowish or olive, and the stature medium. The Mongolian race includes the natives of Mongolia, a large region in the east-central part of Asia, stretching from Turkestan to Manchuria, including an area of 1,450,000 square miles. The inhabitants of this region lead a nomadic life, especially in the portions occupied by the Desert of Gobi or Shamo. They rear large herds of horses, cattle, and sheep, and number about 2,500,000. Other members of the Mongolian race, and who are thought to have descended from the natives of Mongolia, are the Turks, Chinese, Kalmucks, Tartars, Japanese, Burmese, Hungarians, Finns, Eskimos, and Siamese. The Mongols constitute about one-third of the population of the earth, the total number of different branches being estimated at 560,500,000.

The Mongols proper are considered typical of the Mongolian race, but their early history is wrapped in doubt and tradition. Their original seat seems to have been in the vicinity of Lake Baikal, in Siberia, and the earliest notice in history appears in the year 619 A. D., when they are connected historically with the T'ang dynasty of China. In the early part of the 13th century they commenced to attain political power. Genghis Khan, in 1206, began to organize the different tribes into one vast state with the view of conquering the earth. His immediate

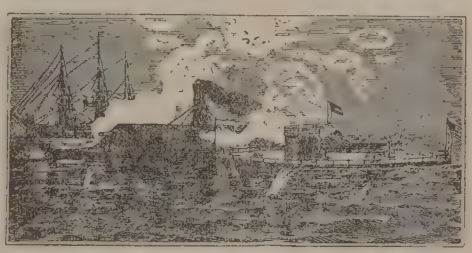
descendants, especially his grandson, Kublai Khan, succeeded in the consummation of at least a portion of the original design. The whole of China was conquered, and a Mongol dynasty came into possession of the Chinese throne, which continued until the 14th century. A great horde of Mongols invaded Russia in 1237; thence they made incursions into Hungary and Poland. In 1241 the Hungarians were crushed completely in a battle at Pesth. When Marco Polo visited China in the latter part of the 13th century, he witnessed the greatest power of the Mongol Empire under Kublai Khan. Its scope of territory included the vast region from Poland to the China Sea, and extended from the Indian Ocean to the northern part of Siberia.

When the Mongol dynasty of China was overturned by a revolution in 1368, it was succeeded by the Ming dynasty, and the Mongols proper were compelled to fall back toward their original possession in the vicinity of Lake Baikal. The next powerful warrior was Tamerlane, known also as Timour and Timurlenk, a descendant of Genghis Khan. He collected many of the Mongol tribes in a new government, of which Samarcand became capital in 1369. Tribal differences and the spread of Buddhism in the East and Mohammedanism in the West operated to divide the different tribes. After the death of Tamerlane the government became gradually weakened, and in 1468 it was divided. The great Mongol Empire of India was the last effort of the Mongols. It was founded by Baber, a descendant of Tamerlane, in 1519, and in 1857 every vestige of it disappeared. The Mongols lost their importance in the 16th century, when they were absorbed largely under separate khanates by different peoples, and their original territory became a part of the Chinese Empire in the 17th century. At present tribes of this typical class of Mongolians are distributed widely in different sections of Eurasia. Their language is classed with the Turanian, and their literature and tradition are devoted chiefly to the empires founded by Genghis Khan and Tamerlane. However, there are various translations from the Chinese and Japanese that have entered to a considerable extent into their general literature.

MONGOOSE (mŏn'gōōs), a species of ichneumon native to India, and closely allied to Egyptian species. The body is weasel-like, from fifteen to seventeen inches long, and the tail fourteen inches. It is often domesticated for the purpose of killing snakes, a feat it performs with much adroitness and safety to itself. The mongoose sucks the blood of its prey, such as birds and reptiles, and leaves the body uneaten. See Ichneumon.

MONIER-WILLIAMS, Sir Monier, author and educator, born in Bombay, India, Nov. 12, 1819; died in Oxford, England, April 11, 1899. His father was surveyor-general in India at the time of his birth, and, after receiving an elementary education, he studied at King's College, London, and Oxford. In 1844 he became professor of Sanskrit in the East India College, at Haileybury, a position he held until 1858, when he was made a professor at Cheltenham. He was elected to the chair of Sanskrit at Oxford in 1860, a position retained to the time of his death. He was the founder of the Indian Institute at Oxford. Subsequently he was granted a number of important honorary degrees. He is the author of many excellent works. Among his writings are "English-Sanskrit Dictionary;" "Indian Epic Poetry;" "Sanskrit Grammar;" "Holy Bible and Sacred Books of the East;" "Buddhism" and "Brahmanism;" "Study of Sanskrit in Relation to Missionary Work," and "Reminiscences of Old Haileybury College." He was knighted in 1886.

MONITOR (mŏn'ĭ-tẽr), the name applied to a class of ironclad vessels, originated by John Ericsson in 1861. The first structure



MONITOR AND VIRGINIA

of this kind was built under an order from the United States government and was completed by Captain Ericsson in about three months. The guns were placed in a revolving turret or tower, and the wooden frame of the ship was covered with plates of iron. This ingenious vessel was able to cope with the Virginia, a Confederate warship, which had formerly been called the Merrimac. Immediately several European countries began the construction of similar vessels. Monitors are now constructed with one or two revolving turrets, in each of which one or more powerful guns are located, and the whole is designed to secure a large amount of power with the least possible exposure to the enemy. Modified devices are employed extensively on the various ironclads, but all are patterned more or less after the principles employed by Ericsson.

MONK (mŭnk), **George**, duke of Albemarle, noted general, born in Devonshire, England, Dec. 6, 1608; died Jan. 3, 1670. He was the son of Sir Thomas Monk, secured most of his educational training in Holland, but returned to England in 1638 to engage with the army against the Scotch, and was promoted to the rank of lieutenant-colonel. In 1642 he accompanied an expedition to crush the Irish rebellion, and in 1644 sup-

ported Charles I. in his struggle with the parliament. His forces were defeated at Fairfax, where he was taken prisoner, and was confined in the Tower for two years. His liberty was regained in 1646 by taking the covenant to support the parliamentary party, and shortly after he served that party in Ireland. Later he took part with Cromwell in Scotland, where he was made major-general and commissioned to conduct the war. All of Scotland was reduced to obedience in 1650, and three years later he co-operated with Admiral Dean in defeating the navy of Holland under command of Van Tromp. In 1654 he was made governor of Scotland, a position he held five years, and at the death of Cromwell he began a march to London, entering the city without opposition in the early part of 1660 with 600 men. The royalist party had looked upon Monk as a possible supporter, and he employed great cunning and deceit to avoid committing himself until it was reasonably certain that the Stuarts could be restored. By a policy of this kind it was possible to reorganize the parliament by admitting excluded members, and to limit the parliamentary army. On May 23, 1660, he consummated his plan of the restoration by meeting Charles II. at Dover. The king promptly rewarded him with honors, created him duke of Albemarle, and settled upon him a pension of $35,000 a year. During the plague in 1665 he demonstrated great ability as governor of London, but soon after retired entirely from

SPIDER MONKEY.

public notice. His death occurred from dropsy, and the remains were buried in Westminster Abbey.

MONKEY, a name commonly applied to the whole order of quadrumanous mammals, but the term is limited in its application by some writers to those having a well developed tail and generally cheek pouches, but they exclude baboons, apes, and lemurs. The many species of monkeys are classified into two sections, the lower and higher. The former are known as new-world monkeys or platyrrhini, and the species are

MACAQUE MONKEY. HOWLING MONKEY.
CAPUCHIN MONKEY. SQUIRREL MONKEY.

native to the tropical regions of America. There are ten varieties north of the Isthmus of Panama, though none are found north of the Rio Grande. The animals of this division have tails, are devoid of cheek pouches, and live largely in trees. They feed principally on vegetable food. Among the varieties of this section are the howling monkeys, a class known from their peculiar noise at night; the marmosets, a variety small in size but peculiar for their silky fur, and the squirrel monkeys, spider monkeys, macaque monkeys, capuchin monkeys, and a number of others.

The higher section embraces the old-world monkeys or catarrhini, and includes numerous species common to Africa, Asia, and many of the adjacent islands. The tail is either wanting or rudimentary, the nostrils are set obliquely, and there are cheek pouches that serve to store food before it is masticated. Among the representative species of this section are the baboons, orangs, gorillas, proboscis monkeys, chimpanzees, anthropoid, or man-like apes, sacred monkeys of the Hindus, monas, Diana monkeys, mandrils, gibbons, wanderoos, and many others. In general the old-world monkeys have a broad face, which distinguishes them from the new-world species, and their tails, if any, are not used for climbing. All species have a more or less separated thumb and great toe, the former being more prominent than the latter. The name quadrumana is applied for that reason, meaning that they are four-handed.

MONMOUTH (mŏn′mŭth), a city in Illinois, county seat of Warren county, 180 miles southwest of Chicago. It is an important railroad center, has excellent public schools, and is the seat of Monmouth College, a Presbyterian institution founded in 1856. This college has about 300 students and a library of 21,000 volumes. The municipal facilities embrace electric light-

ing, pavements, and street railways. Among the manufactures are cigars, sewer pipe, carriages, machinery, flour, earthenware, and soap. It has a growing trade in farm produce and merchandise. Population, 1900, 7,460.

MONMOUTH, Battle of, an important engagement of the Revolutionary War, fought on June 28, 1778, in Monmouth county, New Jersey. The British evacuated Philadelphia on June 18 for the purpose of concentrating at New York, and it was Washington's design to strike a severe blow upon their forces. He accordingly took a position at Allentown, New Jersey, and Gen. Charles Lee was dispatched with 6,000 men to make an aggressive attack, but he soon retreated without striking a blow. Washington at once severely rebuked Lee, restored order among the retreating troops, and a drawn battle resulted. The Americans lost 362 and the British 416 men, but Clinton made good his escape to New York. Lee was court-martialed for his conduct and deprived of his command for a year.

MONMOUTH, James, Duke of, British soldier, born at Rotterdam, Holland, April 9, 1649; beheaded July 15, 1685. He was the son of Charles II. and his mistress, Lucy Waters, but some have doubted his paternity, though it was admitted by Charles. After Charles II. was restored, Monmouth became duke of Orkney and of Monmouth, and wedded the rich heiress of the earl of Buccleuch. He commanded in Scotland in 1679, and defeated the Covenanters at Bothwell Bridge. In 1683 it became known that he aided in instigating the Rye House Plot, in which Algernon Sidney and Lord William Russell lost their lives, and was accordingly exiled to Holland. He claimed the throne of England at the death of his father, and landed in England on June 11, 1685. With a force of 3,000 undisciplined peasants and miners he risked a battle with the forces of James II., but was defeated at Sedgmoor and captured. His apparent repentance and promise to embrace the Catholic religion did not save him from execution nor move the king to mercy.

MONOMETALLISM (mŏn-ō-mĕt'al-ĭz'm), the financial theory of a single metallic standard in the coinage of money. See **Bimetallism.**

MONONGAHELA (mō-nŏn-gą-hē'lą), a river having its source in Upshur county, West Virginia. It has a general course toward the northeast to the Pennsylvania line, thence flows northward to Pittsburg, where it joins the Allegheny to form the Ohio. It is a rapid stream, supplying an abundance of water power, has a length of 150 miles, and is navigable for river boats a distance of fifty miles.

MONOPOLY (mŏ-nŏp'ō-lў), a term applied in economics to the exclusive power of sale, production, transportation, or purchase of any commodity. Monopolies of various kinds have existed from remote history. They were maintained at various times by monarchs to enhance their own profit, and at other times to enrich chiefs or favorites, and also to raise supplies for the maintenance of government. Monopolies were abundant especially during the Middle Ages, practically all of the trade privileges and production of necessary commodities being in the hands of individuals or associations for individual or corporate gain.

It is no doubt true that monopolies are generally an evil, since they give special advantages to the classes most able to battle for an economic existence, and on the other hand they work a hardship upon the industrial and laboring classes. However, there are instances in history where monopolies have been the means of effecting permanent good, such as those resulting from patents to land in the early development of the American continent. These patents gave certain individuals control of trade with the lands to be discovered or settled, thus making it possible to secure enormous reward for enterprises whose risks would otherwise have prevented their being undertaken The East India Company, chartered in England in the reign of Queen Elizabeth, is a notable example of a vast monopoly. It was at first beneficial in developing enterprises, but later became greatly opposed by the people owing to its depressive influence upon men of small means, and particularly because it affected those who sought to found new and infant industries.

In general the monopolist has absolute control over the prices of his services or commodities. By controlling the supply he is able to create an artificial scarcity, thus making it more difficult to attain the necessary commodities to support life, and a rise in price to the limit of the consumers' power to purchase is the result. Anyone beginning business with small means may be ruined in his enterprise by the monopolist selling his products below the cost of production, but, after the small trader or manufacturer has become bankrupt, the prices are again raised to an exorbitant rate. Among the monopolies are those known as landed, by which corporations have come into possession of the principal fields containing valuable deposits of natural gas, petroleum, anthracite and bituminous coal, and forests. Transportation monopolies affect the market by controlling largely the transportation facilities. The so-called legal monopolies include those especially reserved by the government or granted by patents or charters to individuals and corporations. There has been a tendency for some decades to promote enterprises of a monopolistic character in all lines of production whereby the producers, traders, or manufacturers can secure special advantages of some kind and to some extent. In several political campaigns the question of monopolies or

trusts has been an important factor, particularly in 1900, but the solution still awaits at least to a large extent the earnest application of true principles of statesmanship.

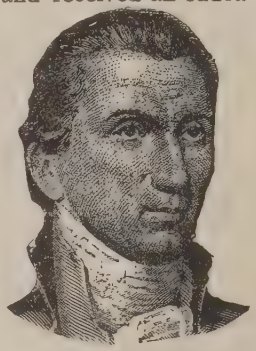
The postoffice system of the United States is a government monopoly, but it is the most wholesome and beneficial institution supported by the whole people for the benefit of all classes. There are tendencies that indicate a strong drift toward other systems coming under like control, such as the telegraphs, telephones, public lighting, street railways, and even railroads. Germany and France control exclusively the tobacco trade, this commodity being produced or imported and sold by government agents to yield public revenue. Railroads, electric car lines, and telegraphs are managed quite generally in the same way by Russia, Germany, Austria, and other countries of Europe. The United States government grants a monopoly for a period of seventeen years to an inventor under a patent, and to authors copyrights are issued for a period of twenty-eight years, and the latter may be renewed for fourteen years if certain conditions are complied with. Both patents and copyrights have been the means of inducing men of genius to devote many years of careful study to the invention and publication of products of much value.

MONOTREMATA (mŏn-ō-trĕm′ȧ-tȧ), an order of mammals that have only one aperture for the genital, urinal, and intestinal canals. The mammary glands are well developed, but have no nipples, and the species in which teeth exist at all have them formed of four horny plates. Darwin traced a certain connection between higher mammals and reptiles through the monotremata, and also showed their approach to birds. The mole-duck and porcupine ant-eater of Australia are representative species of this order.

MONROE (mon-rō), a city in Louisiana, capital of Ouachita parish, in the north-central part of the state. It is nicely situated on the Ouachita River, has railroad conveniences, and is the seat of several fine school and public buildings. Among the manufactures are lumber, brick, cigars, machinery, furniture, and cotton-seed oil. It has a considerable trade. Population, 1900, 5,428.

MONROE, county seat of Monroe county, Michigan, at the mouth of the Raisin River, thirty-five miles southwest of Detroit. It is about two miles from Lake Erie, has important railroad facilities, and is surrounded by a productive farming and fruit-growing country. There are manufactures of paper, tile, flour, lumber products, furniture, and machinery. It has a large commercial trade, good schools, modern municipal facilities, and is the seat of a woman's seminary. Population, 1904, 6,128.

MONROE (mŭn-ro′), **James**, fifth president of the United States, born in Westmoreland county, Virginia, April 28, 1758; died in New York City, July 4, 1831. He was the son of Spence Monroe and Elizabeth Jones, natives of Virginia, and received an education at William and Mary College. In 1777 he enlisted as a private soldier in the Revolutionary army. He took part in several battles, was wounded at Trenton, and for distinguished service became lieutenant-colonel. In 1777-78 he distinguished himself as aide to Lord Stirling, studied law under the direction of Thomas Jefferson, then governor of Virginia, and in 1780 served on an important commission to the army in South Carolina. He was chosen a member of the Virginia assembly in 1782, and the next year became a delegate to the continental congress, in which he served until 1786. While a member he married a Miss Kortright, of New York City, and, after retiring from congress, entered upon the practice of law at Fredericksburg, Virginia. Shortly after he became a member of the legislature, and in 1788 was selected a delegate to the state convention that assembled to consider the federal constitution.



JAMES MONROE.

The efforts of Monroe were in unison with those of Patrick Henry and other anti-federalists, who held to the doctrine that large powers should be vested in the people. From 1790 to 1794 he served as a member of the United States senate, but in the latter year was appointed by Washington as minister to France. His open expression in favor of the Revolution caused his recall in 1796, when he was again elected to the legislature, and from 1799 to 1802 served as governor of Virginia. His political views were in accord with those of Jefferson and the democratic party, and he was accordingly selected as envoy extraordinary to France in 1802, and in 1803 became the successor of Rufus King as minister to London, where he remained till 1807. While in France he served with Livingston and Robert Morris in effecting the Louisiana Purchase in 1803, and in 1805 undertook to negotiate the purchase of Florida from Spain, but in this he failed. He was again elected governor of Virginia in 1811, but in the same year was selected by President Madison as secretary of state, serving until 1817.

In 1816 Monroe was elected president of the United States as a democrat, receiving 183 electoral votes, while Rufus King received thirty-four. His administration was so eminently successful that it became known as "The era of good feeling," and in the election of 1820 he received 231 electors out

of a total of 235. Monroe surrounded himself by the most eminent statesmen of his time, and demonstrated vigorous ability in dealing with public questions. Among the events of his administration are the purchase of Florida from Spain in 1819; the Missouri Compromise regarding slavery; the Seminole War; the visit of Lafayette; the recognition of the independence of the South American republics, and the establishment of the Monroe Doctrine. After retiring from the presidency, he took up his residence in Loudon county, Virginia, served as president of the convention called to revise the state constitution, and later made his home with his son-in-law, Samuel L. Gouverneur, in New York City.

MONROE DOCTRINE, a declaration promulgated by President Monroe. It commits the United States to a policy by which interference of European powers in the political affairs of North and South America is prohibited. After 1815, following the overthrow of Napoleon, an alliance was formed by Russia, Germany, Austria, and France for the purpose of preserving the balance of power and suppressing revolutions within their dominions. Mexico and the states of South America revolted against Spanish occupation, and in 1822 the independence of these countries was recognized by the United States. It was suspected that the allied powers would come to the rescue of Spain, on account of which Monroe declared in a message to congress on Dec. 2, 1823, "that the American continents are henceforth not to be considered as subject to colonization for any European power. With the existing colonies or dependencies of any European power we have not interfered, and shall not interfere, but with the governments which have declared their independence and maintained it, and whose independence we have acknowledged, we could not view any interposition for the purpose of suppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States." The doctrine thus announced has been maintained on many subsequent occasions, particularly in relation to the Isthmus of Panama, the French intervention in Mexico under Maximilian, and the dispute between Great Britain and Venezuela regarding the boundary between the latter and British Guiana. The Spanish-American War involved also this feature of the doctrine, namely, that a country having possessions in America is bound to exercise reasonable intelligence and a humane policy in dealing with the people and their civil institutions.

MONROVIA (mŏn-rō′vĭ-ą), a seaport city of Liberia, West Africa, and so named in honor of President Monroe. It was founded in 1824, is the capital of Liberia, and contains a number of excellent public buildings and a considerable trade. Population, 6,645.

MONS (mōns), a city of Belgium, capital of the Hainaut province, on the Trouille River, thirty-five miles southwest of Brussels. It is connected by several railroads, and has important manufactures of cotton and woolen goods, sugar, spirituous liquors, cutlery, soap, and machinery. There are extensive coal fields in its vicinity, and the surrounding country is productive of cereals and domestic animals. Mons has a fine cathedral, good schools, and splendid boulevards. It is the seat of several hospitals, asylums, and libraries. Its site was occupied by a Roman fort. In 804 it was made the capital of Hainaut by Charlemagne, and since then has been a prominent factor in contests between Austria and France. Population, 48,218.

MONSOON (mŏn-sōōn′), a term applied in general to winds blowing half the year in one direction and half in the other, such as occur regularly in certain sections of North America, North Africa, Australia, and regions of South Africa. They are caused by the unequal heating of the land and water, and of the several large land masses in the regions in which they affect the continents. They are of utility in navigation in that navigators plan their voyages to take advantage of the movements of air, thus rendering it less expensive to make rapid voyages by steamboats. Monsoons also serve to bring rain to countries which would otherwise lapse into deserts. The term is applied particularly to the modification of the regular trade winds that are common to the Indian Ocean, the Bay of Bengal, and the western Pacific. These monsoons are of two classes, the southwestern prevailing from April to October, and the northeastern prevailing from October to April.

MONTAGU (mon′tą-gū), **Lady Mary Wortley**, famous letter-writer, born in Thoresby, England, in 1690; died Aug. 21 1762. She was the eldest daughter of Evelyn Pierrepont, was introduced by her father to the Kit-Cat Club at the age of eight years, and received a classical education. In 1712 she married Wortley Montagu, a personal friend of Queen Anne, and thus came in contact with the court society of London. Her ready wit and great beauty made her distinguished at the court of George I. Among her personal friends were such men of literature as Pope and Addison. Her husband was appointed ambassador to Constantinople in 1716, where the two remained until 1718. During that time Lady Montagu became famous for her "Turkish Letters," productions which are characteristic for the independent judgment of the writer as well as for her keen observation and splendid descriptive power. While in Turkey she became favorably impressed with the practice of inoculation for small-pox, which she first tried on her own son, and afterward encour-

aged it in England. A complete edition of her writings, entitled "Letters and Works," was published in 1837.

MONTAIGNE (mŏn-tāñ), **Michel Eyquem de**, author and moral philosopher, born in Perigord, France, Feb. 28, 1533; died Sept. 13, 1592. He was trained from early infancy under a system which met the approval of his father. For the purpose of forming habits of industry and acquiring sympathy for the poor, he was nursed in a common village home, where he was taught no language but Latin, and which constituted his only means of conversation until he was six years of age. At that time he was sent to a school, and in his tenth year entered the College of Bordeaux. Subsequently he took a course in law, and in 1554 became councilor in the parliament of Bordeaux, in which position he served thirteen years, and married a lady of that city. He retired from public service in 1571 for the purpose of engaging in literary work, his first production being a translation of "Natural History," a Spanish work. The death of his brothers gave him sole possession of his ancestral estate, where he devoted himself to writing his famous "Essays." These writings treat of various topics in relation to morality, industry, daily associations, and many kindred subjects, and include several that have grown continually in favor and are still widely read. These writings are popular because the author invented a literary form of great perfection, and applied it with marked efficiency in treating the various topics of interest. Several of the essays have been translated into many languages, and are as widely read as some of the productions of Schiller and Shakespeare.

MONTANA (mŏn-tă'nạ), a northwestern state of the United States, whose northern boundary is formed by the Dominion of Canada, eastern by North and South Dakota, southern by Wyoming and Idaho, and western by Idaho. Its length from east to west is 525 miles; greatest width 300 miles, and area 146,080 square miles, being exceeded in extent only by California and Texas. The eastern portion comprises an elevated plain. In the western part are lofty ranges of the Rocky Mountains, many of which tower to altitudes of from 8,000 to 12,000 feet. The average height of the mountains approximates 6,000 feet, and the general elevation of the state is 3,000 feet. Among the principal mountain ranges are the Bitter Root, Little Rocky, Bear's Paw, Big Belt, Little Belt, Crazy, and Gallatin mountains. Flathead Lake is the only large body of water. The principal drainage is by the Missouri and its tributaries, but the western portion is drained by the Columbia River system. Among the principal rivers are the Missouri, Columbia, Yellowstone, Big Horn, Tongue, Powder, Musselshell, Milk, Marias, Teton, Beaver, Missoula, Flathead, and Kootenai. Yellowstone National Park is situated on the southern boundary, from which the Yellowstone enters Montana and flows through a large portion of the Bad Lands extending into the state from Wyoming. Montana has a mean temperature of 46°. The atmosphere is clear a large portion of the time; its winters are quite pleasant, but the rainfall is insufficient in much of the state to produce cereals without irrigation. Winds coming from the west temper the climate sufficiently to make it quite moderate and highly healthful.

The mineral wealth of Montana is enormous, including vast deposits of gold, silver, lead, coal, copper, limestone, sandstone, sapphire, and a number of others. Its production of copper has been of the first rank, surpassing in the output of this metal the entire Lake Superior region. The average value of the annual output of all metals is about $58,500,000; the copper output representing about one-half that amount. The plains of Montana are entirely treeless, but there are valuable forests in the valleys and mountain ranges, including such varieties as cedar, aspen, pine, fir, cottonwood, box-elder, and oak. Agriculture is carried on under a system of irrigation, though in the northwestern part of the state crops germinate and mature successfully without artificial watering. Among the chief products are wheat, oats, barley, corn, hay, potatoes, and many varieties of fruit. Stock-raising is a principal industry, the state taking first rank in the rearing of sheep, and there are also large numbers of milk cows, other cattle, horses, mules, and swine. The manufactures embrace lumber, flour, furniture, machinery, utensils, earthenware, and lumber products. At present the total railroads aggregate 3,400 miles, and several lines are projected.

Ample facilities have been made for educational progress by reserving lands for that purpose, and also by providing a liberal system of taxation. Common schools are under adequate supervision, and in connection with them are efficient high schools and other institutions. The State Agricultural College is situated at Bozeman, the State University at Missoula, and the State Normal School at Dillon. It has adequate reformatory and correctional institutions, hospitals, and institutes for the deaf and dumb, blind, and destitute children. All the principal religious societies are represented by prosperous organizations, many of which have educational institutions. There are also numerous non-sectarian schools and colleges supported as private enterprises. About one hundred newspapers are published, of which fifteen are issued daily and seventy-five weekly.

Montana was formed partly of the Louisiana Purchase and partly of a region formerly included with Washington and Oregon, the former lying east of the Rocky Mountains. The region was first explored in 1742 by the

French, and soon after Jesuit missionaries began to operate among the Indians. An abundance of wild game and many fur-bearing animals made it a favorable region for trappers and fur traders; some traces of these enterprises still remain. Gold was discovered in 1861, and soon a stream of immigrants began to build settlements in the western portion. A territory was formed in 1864, and its admission into the union was effected in 1889. Railroad building and the construction of irrigation canals soon caused agriculturists and stock raisers to settle there in large numbers, and since then its development has been steady and rapid. It is popularly known as the Stub-Toe State. Helena is the capital. Other cities of importance include Butte City, Anaconda, Bozeman, Livingston, Missoula, Great Falls, and Kalispel. There are twenty-four counties in the state. The population in 1900 was 243,329. This includes a colored population of 17,046, of which 1,523 are Negroes and 11,343 Indians. The total colored population aggregates seven per cent. and the male population 61.6 per cent.

MONT BLANC (mŏn blŏn′), meaning White Mountain, a celebrated mountain situated on the boundary between Italy and France, and near the frontier of Switzerland. It is a peak of the Alps, the loftiest of Europe, rising to an altitude of 15,787 feet. This vast mountain is about thirty miles long and ten miles wide. It has many summits, and is formed largely of granite. In 1786 the highest peak was reached under the direction of Jacques Balmat, this being the first entire ascent. Among the thirty glaciers that have their source in Mont Blanc are Mer de Glace, Bois, and Des Bossons.

MONTCALM(mŏnt-käm), **Louis Joseph, Marquis de**, colonial soldier, born near Nimes, France, Feb. 28, 1712; died Sept. 14, 1759. He secured a careful education, entered the army at the age of fifteen, and served successively in Italy, Bohemia, and Germany. In 1743 he was promoted colonel, and in 1755 succeeded General Dieskau in Canada as commander-in-chief. The following year he landed in America. Soon after he captured Oswego. In 1757 he occupied Fort William Henry, and the next year took possession of Ticonderoga. At that place he was attacked by General Abercrombie with 15,000 men in 1758, but Montcalm repulsed his force by skillful strategy. In 1759 General Wolfe ascended the St. Lawrence to engage Montcalm in battle, and on Sept. 13 led an attack at the Heights of Abraham, near Quebec. About 5,000 men were engaged on each side, and both Wolfe and Montcalm were mortally wounded. Wolfe died the same day, and Montcalm expired the following morning. As a result of the battle the French lost all of Canada.

LOUIS JOSEPH MONTCALM.

MONTCLAIR, a town of New Jersey, in Essex county, about five miles northwest of Newark. It is the seat of excellent public schools, and is the residence of many New York business men. Electric lights, pavements, waterworks, and electric street railways are among the improvements. It has various manufactures and a considerable trade in merchandise, fruits, and cereals. Population, 1900, 13,962.

MONTE CARLO (mōn′tā kär′lō), a small town in Monaco, near the Mediterranean. It is noted as a popular resort for health seekers and gamblers. The gambling institutions are authorized by the prince of Monaco for the purpose of securing revenue to defray the expenses of government. There are splendid buildings and much business activity. It is estimated that the average number of visitors annually approximates 400,000.

MONTEFIORE (mon-te-fe-ō′ra), **Sir Moses**, philanthropist, born at Leghorn, Italy, Oct. 24, 1784; died at Ramsgate, England, July 28, 1885. He was born of Jewish parents, whom he accompanied to London in childhood, and, after receiving a fair education, entered upon a successful and brilliant career as a banker. In 1837 he became sheriff of London, was admitted to knighthood the same year, and in 1846 was made a baronet. After 1854 he devoted his time almost entirely to benevolent work in endeavoring to improve the condition of Jewish people. For this purpose he made visits to Russia, Austria, Roumania, and Palestine, and not only petitioned the czar of Russia and other sovereigns for the proper treatment of the Jewish people, but also spent vast sums of money to bring about educational and political reforms. In 1835 he devoted $75,000,000 for the purpose of compensating slave owners in British possessions for liberating their slaves. He founded the Judith Montefiore College at Ramsgate in memory of his wife, an institution adequately equipped for the training of Jewish divines. Distinguished honors were accorded him by sovereigns of all civilized countries, and at the age of one hundred years he was still hale and active.

MONTENEGRO (mōn-tā-nā′grō), meaning Black Mountain, an independent principality between Turkey and Austria. Its boundary is formed by Albania, Herzegovina, Dalmatia, and the Adriatic Sea. For about 400 years it maintained an independent existence against Turkey, and in 1878 its independence was formally recognized by the European powers at the Berlin conference. The area is 3,630 square miles, its

population 246,120, and Cettinje is the capital city. Much of the surface is mountainous, being traversed by the Dinaric Alps, the highest peaks attaining an elevation of 8,825 feet. The principal drainage is by the Moratcha River, and on the southern boundary is Lake Scutari. The soil is highly productive along the coast and in the valleys. Among the principal productions are corn, rye, barley, potatoes, cheese, honey, butter, and fruits. Cattle, sheep, goats, and horses are reared in the grazing lands of the mountains. The mountain slopes furnish a supply of valuable timber, including many hardy varieties, and there are also extensive stone quarries and fisheries. The people are Slavs. They belong almost entirely to the Greek Catholic Church. The government supports a general system of education, the schools being free to all. Attendance at school is nominally compulsory. The commercial trade is developing steadily under government stimulation. Among the chief manufactures are woolen goods, implements, earthenware, machinery, jewelry, and clothing.

Montenegro belonged to Servia in the Middle Ages, but, when the latter was conquered by the Turks in 1389, the Montenegrins fortified themselves in the mountains. There they offered stubborn resistance to Turkish attacks until 1714, but soon after again became independent under the protection of Russia. Pietro I. was recognized as a bishop-prince in 1796 and defeated the Turks under the pasha of Scutari, and for a quarter of a century maintained peace. He was succeeded by Pietro II. in 1830, who in his reign of twenty-one years was successful in establishing schools and effecting internal improvements. At the death of that sovereign the church and state became separated, but the reforms in the civil service did not meet the approval of Russia, and the Turks took advantage of this condition by invading the country. The great powers compelled the conclusion of a treaty in 1853, but the sovereignty of Turkey was formally recognized in 1862. In the war of Russia against Turkey, in 1877-78, the Montenegrins coöperated with the former, thus securing their independence at the close of the contest. The government at present is a constitutional monarchy. Executive authority is vested in a prince, and the legislative power in a general council. The language and literature are Servian. Cettinje has a population of 2,800; the other towns of importance are Podgoritza, 6,150; Dulcigno, 5,225, and Niksik, 3,200.

MONTEREY (mŏn-tę-rā′), a city of northern Mexico, capital of the state of Nuevo Leon. It is an important railroad center. The city is surrounded by a fertile agricultural country, and has an extensive jobbing trade. It has manufactures of cotton and woolen goods, tobacco products, clothing, machinery, jewelry, and utensils. In manufacturing enterprise it takes high rank among the cities of Mexico. It is supplied with modern municipal facilities, has a cathedral, a number of fine churches, public schools, and several institutions of higher learning. The city was captured by the American forces under General Scott on Sept. 19, 1846. Population, 47,300.

MONTESQUIEU (mŏn-tĕs-kū′), **Charles de Secondat, Baron de**, author and philosopher, born near Bordeaux, France, Jan. 18, 1689; died in Paris, Feb. 10, 1755. He descended from a distinguished family of Guienne, and secured a careful training in literature, philosophy, and jurisprudence. In 1714 he became councilor of the Bordeaux parliament, and two years later was made its president. He possessed a natural love for science and literature, and selected the latter as a special pursuit because of having weak eyesight. In 1721 he published one of the great works that made him famous, entitled "Parisian Letters." This production was designed to represent the views of two distinguished visitors at Paris, and constitutes a number of excellent satires on the society and practices of the French. Shortly after he spent a number of years traveling in foreign countries to study the institutions and political life of his time, and in 1728 was admitted to the French Academy. His great work, entitled "Spirit of Laws," embodies the research and labor of twenty years. This work is a treatise of the relation that ought to exist between the laws of a country and its commerce, manners, religion, industries, and particularly its constitution. It came to the attention of Frenchmen shortly after the Revolution of 1848, and was a potent instrument in directing the efforts of reformers and statesmen. It has been translated into various languages, and went through a large number of editions in France. The third of the three celebrated works upon which his reputation is based chiefly is a publication that appeared in 1734, entitled "Thought Upon the Causes of the Greatness of the Romans, and Their Decay." This work, as the title implies, is a treatise on the history of Rome, and was popular alike for its vigorous style and masterly review.

MONTEVIDEO (mŏn-tē-vĭd′ē-ō), an important city of South America, capital of Uruguay, on the north shore of the estuary of the La Plata, 128 miles east of Buenos Ayres. Its site is on a small peninsula. It has a fine climate, and possesses an excellent and well sheltered harbor. The streets are platted to cross each other at right angles. They are improved by many modern facilities, and as a whole the city is one of the best built and most modern in South America. There is a fine public school system, several colleges, and a national university. The latter institution has advanced courses of study, seventy-five professors, and about 1,000 students. Originally the harbor had

an average depth of seventeen feet, but there have been extensive improvements by excavations and the construction of dry docks and wharves. The export and import trade is very important, since its location is at the most convenient point for river navigation on the Uruguay and Parana rivers. It also has extensive railroad connections with interior points. Among its manufactures are cotton and woolen goods, machinery, hardware, utensils, furniture, lumber products, and clothing. Steamboat communication is maintained with all the leading countries of the world. Besides a fine cathedral, the city has imposing government buildings, an opera house, a museum, a public library, and a large number of newspapers and periodicals. The population includes a large number of French, Spanish, and Italians. Fully one-third of the people are of these three races. Montevideo was founded in 1717. It was made the capital of Uruguay in 1828. Population, 270,372.

MONTEZUMA (mon-tą-zōō'mą), the name of two emperors of Mexico. Montezuma I. ascended the throne about 1437, and soon enlarged his dominion by defeating the king of Chalco and annexing his territory. He is regarded the most able Mexican emperor, since he demonstrated much ability in adding consecutive annexations, and in making the possessions of the Montezumas the most extensive in the region that now comprises Mexico. His death occurred in 1471. Montezuma II. was the last Aztec emperor of Mexico. He succeeded to the throne in 1502, and became noted as an advanced sovereign in encouraging architecture and industrial arts. It was during his reign that the famous palaces of Mexico were constructed, and also that the Mexican frontier was pushed forward to include all the territory as far south as Honduras and Nicaragua. His court was one of much wealth and magnificence. In his reign the capital city was improved by the building of aqueducts and thoroughfares. When the Spanish under Cortez landed on Mexican soil, in 1518, he recognized that they were superior in military skill and offered to make peace with them by turning over his treasures. After he had been imprisoned by the Spaniards, repeated indignities were heaped upon him, and his death resulted from a wound received accidentally on June 30, 1520. Charles V. made his eldest son count of Montezuma. Some of his descendants adopted the Christian religion, and a number held high official positions, particularly Don Marsilio de Teruel. However, he was afterward banished from Spain and later from Mexico on account of his liberal political views.

MONTFORT (mŏnt'fȯrt), **Simon de**, earl of Leicester, noted character in early English history, born in France in the early part of the 13th century; slain in battle, Aug. 4, 1265. He descended from a noble French family, but in 1230 came to England, where he entered the service of Henry III. On Jan. 7, 1238, he privately married the sister of the king, widow of the earl of Pembroke. This marriage contract caused opposition among the barons and also implicated the court for the reason that Eleanor, the newly wedded wife, had taken a religious vow. However, Montfort obtained the papal sanction, and in 1240 went on a crusade to the Holy Land. In 1258 the barons and others moved to banish the foreigners from the court of Henry III., partly because of jealousy, but chiefly on account of a famine that had been occasioned by poor crops. This movement was headed by Montfort. The parliament met at Oxford, where the so-called Provisions of Oxford were enacted, by whose terms the foreigners were required to surrender many of their estates and castles, Montfort himself losing Odiham and Kenilworth. The king repudiated the Provisions in 1261, but later agreed that Louis XI. of France should arbitrate the question, and that sovereign by the Mise of Amiens gave a decision favorable to the king. Montfort and the barons refused to submit without an armed contest. A battle followed on May 14, 1264, in which the king was not only defeated, but taken prisoner. Shortly after a parliament of bishops, barons, and abbots was called to adjust the difficulties. The representation in that body was based upon certain towns and districts. Montfort and the people insisted upon a constitution in which representative government should be recognized. This parliament was the beginning of the movements that led to a constitutional monarchy in England. The constitution formed at that time was accepted by the king on Feb. 14, 1265, but the barons were not satisfied. They immediately revolted; Montfort vigorously defended the constitution and was slain in battle at Evesham, Aug. 4, 1265. His memory has been perpetuated because of his devotion to representative government. He has been celebrated in song and poetry as St. Simon.

MONTGOLFIER (mȯnt-gol'fĭ-ẹr), the family name of two brothers distinguished as inventors of the balloon. Joseph Michel Montgolfier was born at Vidalon-les-Annonay, France, in 1740, and died in 1810; Jacques Etienne Montgolfier was born at the same place in 1745, and died in 1799. They descended from a celebrated paper-maker, and became engaged in the same industry. The two took a joint interest in studying the invention of a balloon that was to be inflated by rarefied air, and in 1782 made the first successful ascent on record with such a machine. Both secured distinguished honors and were admitted as members to the French Academy. Joseph was also the inventor of the calorimeter, the hydraulic screw, and several other useful appliances.

MONTGOMERY (mŏnt-gŭm'ẹr-ĭ), the

capital of Alabama, situated in Montgomery county, on the Alabama River, about 300 miles above Mobile. The surrounding country has valuable deposits of iron and coal, and produces large quantities of cotton, cereals, and stock. Steamboats ascend the Alabama River to Montgomery. It has important railroad connections, good schools, and a state normal school for colored students. The city has fine streets, pavements, public waterworks, electric lights, and street railways. Among the manufactures are tobacco products, spirituous liquors, confectionery, soap, oil, machinery, eathenware, vehicles, and utensils. Its handsome buildings include the Masonic Temple, county and state buildings, several high schools, and a number of fine churches. The jobbing trade is important, especially in merchandise and farm produce. Population, 1900, 30,346.

MONTGOMERY, Richard, American general, born near Raphoe, Ireland, Dec. 2, 1736; died at Quebec, Canada, Dec. 31, 1775. He graduated at Trinity College, Dublin, and soon after entered the army. He came to America as a colonial soldier, was with General Wolfe at the siege of Louisburg in 1758, and in 1762 took part in the expedition against Martinique and Havana. In 1773 he settled in New York City, where he married the daughter of Robert R. Livingston, and in 1775 became a brigadier-general in the continental army. While serving in Canada, he captured St. Johns and Montreal, and shortly after was promoted to the rank of major-general. In the latter part of 1775 he joined the army under Gen. Benedict Arnold, and on Dec. 31 an effort was made to capture Quebec by an assault. The enterprise failed; 400 Americans being captured, Arnold wounded, and Montgomery killed. The remains of Montgomery were buried at Quebec, but later congress authorized their removal and the erection of a monument, which stands in front of St. Paul's church, New York City.

MONTH, a period of time, originally equal to the interval between two new moons. This division of time afterward came to be called a lunar or synodical month, and is equal on the average to 29 d. 12 hr. 44 min. 2.9 sec. The sidereal month is the interval occurring between two successive conjunctions of the moon with a particular fixed star. Its average length is 27 d. 7 hr. 43 min. 11.5 sec. The anomalistic month indicates a revolution of the moon from perigee to perigee, having an average length of 27 d. 13 hr. 18 min. 37.4 sec. The solar month is one of the twelve parts into which a solar year is divided, equaling 30 d. 10 hr. 29 min. 5 sec. The calendar month is fixed distinctly by law for ordinary purposes. Calculations of time by months have come down to us from remote antiquity, the lunar month being used mostly by the ancients, and there is still a large per cent. of people who use that form of calculation, notably the Mohammedans and many other classes of Asia and Africa. The calendar months recognized by Europeans and now generally used by civilized nations were named by the Romans from various heroes and statesmen. The following is a complete list:

NAME.	SO NAMED FROM	DAYS.
January	Janus	31
February	Februalia	28
February (leap years)	"	29
March	Mars	31
April	Aperire, meaning to open.	30
May	Maia	31
June	Juno	30
July	Julius Cæsar	31
August	Augustus	31
September	Septem, meaning seventh.	30
October	Oct, meaning eighth	31
November	Novem, meaning ninth	30
December	Decem, meaning tenth	31

It will be noticed from the above that September was originally the seventh month, October the eighth, November the ninth, and December the tenth. To aid in remembering the number of days in each month the following rhymes were made in 1606, and have been employed quite largely in textbooks:

Thirty days hath September,
April, June, and November.
All the rest have thirty-one,
But February twenty-eight alone,
Except in leap-year once in four,
When February has one day more

MONTMORENCY (mŏn-mō-rŏn-sē'), **Anne, Duke of,** eminent general, born at Chantilly, France, March 15, 1492; died Nov. 12, 1567. He descended from one of the oldest and most noted noble families of France, was named Anne from his godmother, Anne of Brittany, and was the first member of the family to attain the ducal title. At the battle of Marignano, in 1515, he first showed distinguished ability, was captured with Francis I. in 1525 at the battle of Pavia, and for eminent valor became constable of France in 1538. In 1541 he was banished from court on account of being suspected of favoring the dauphin, and spent ten years on his estate, but with the ascension of Henry II. he was again reinstated in his former positions of honor. He commanded the French army against Philip II. of Spain in 1557 at St. Quentin, where he was defeated and imprisoned. The peace of 1559 restored him to freedom, and shortly after he joined the duke of Guise in opposition to the regency of Catharine de Medici. At that time he formed the famous triumvirate against the Huguenots and Condé, and was made prisoner by the Huguenots at the battle of the Dreux in 1562. The following year he succeeded in expelling the English from Havre. In 1567 he gained a decisive victory over the Huguenots at St. Denis, but the day following his death occurred from a wound received in battle.

MONTMORENCY (mŏnt'mō-rĕn-sĭ),

Falls of, a famous series of falls on the Montmorency River, a small stream of Canada, which rises in Snow Lake and flows into the St. Lawrence eight miles below Quebec. The falls have a width of about fifty feet, and the main descent of water is over a precipice 245 feet high. The region is remarkable for its natural scenery and is a favorite summer resort. In the winter time the falls are increased in grandeur by vast ice formations, which are often 200 feet in height.

MONTPELIER (mŏnt-pē'lĭ-ẹr), the capital of Vermont, in Washington county, on the Winooski River, forty miles southeast of Burlington. It has a beautiful site, is surrounded by a farming and dairying country, and has a number of important railway lines. Among the excellent buildings are the state capitol, several public schools, a number of beautiful churches, and the Vermont seminary. The city has a fine park, pavements, public lighting, and several libraries, among them the state library with about 30,000 volumes. There are manufactures of furniture, flour, leather, machinery, lumber products, earthenware, and vehicles. A fine statue of Ethan Allen adorns the portico of the state house. Population, 1900, 6,266.

MONTPELLIER (mŏn-pĕl-lyā'), a city in France, capital of the department of Herault, located a few miles north of the Gulf of Lions. It is built beautifully, has a large commercial trade, and is well connected by railroads with the trade centers of southern France and the coast. There are manufactures of chemicals, cotton and woolen goods, perfumes, spirituous liquors, soap, leather, oil, and machinery. The city was founded at an early date in European history. It is the seat of a medical school founded by Arab physicians in the 12th century, a botanical garden established under Henry VI., and contains a number of excellent schools and churches, and a public library of 60,000 volumes. Montpellier was a center of Huguenot influence during the religious wars, and on Oct. 20, 1622, the Edict of Montpellier confirmed the Edict of Nantes by granting religious freedom to Protestants. Population, 70,530.

MONTREAL (mŏnt-rẹ-al'), the largest and most important city of Canada, situated in the province of Quebec, on an island formed by the confluence of the St. Lawrence and Ottawa rivers. It was so named from Mount Royal, "Mont Real," a prominent elevation near the city, which is now utilized as a public park. The city is connected by important railroad lines, has a fine harbor, extensive wharves, and is accessible by canals that admit the passage of the larger vessels to convenient points in the city. Steamboat connections are maintained with all the lake cities of the United States, and with domestic and foreign navigation centers. The manufactures embrace lumber products, machinery, boots and shoes, cotton textiles, woolen and silk goods, tobacco, spirituous liquors, engines, farming implements, sugar, edged tools, and clothing. It has a large trade in grain, lumber, furs, flour, live-stock, and cheese. Among its principal buildings are numerous fine public schools, many churches, several theaters, and government buildings. The Church of Notre Dame is a fine structure that will accommodate 10,000 persons, and the St. Peter's Cathedral is a splendid specimen of architecture modeled after St. Peter's at Rome. There are many institutions of higher learning, among them McGill University, St. Mary's College, Baptist College, and various other institutions founded by the Congregationalists, Presbyterians, and Episcopalians. The site of the city was occupied originally by an Algonquin village called Hochelaga. In 1642 the French founded the present city under the name of Villemarie, but in 1760 it came into British possession under a capture by General Amherst. The colonial troops conquered it in the Revolutionary War, but they were dispossessed in 1777. The seat of government of Lower Canada was located at Montreal until 1849, when it was moved to Quebec. The city has made remarkable strides of advancement, and is now supplied with all modern municipal facilities, such as electric lighting and street railways, telephones, pavements, public libraries, waterworks, and public parks. Population, 1901, 267,730.

MONTSERAT (mŏnt-sẹr-răt'), an island of the West Indies, forming a possession of Great Britain, and containing an area of thirty-two square miles. It belongs to the Leeward group. The surface is mountainous, but it produces coffee, sugar, cacao, limes, and tropical fruits. Columbus discovered the island in 1493. British colonies were first founded on the island in 1632. Earthquakes are of frequent occurrence, and hurricanes are quite common, the latest of importance occurring in 1899, when three-fourths of the inhabitants were forced to depend upon the government for food. Plymouth is the principal town. The population of the island is 11,950.

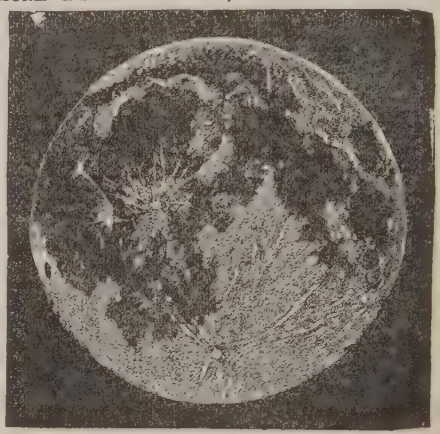
MONTT, Manuel, statesman, born at Petoeia, Chile, Sept. 5, 1809; died in Santiago, March 13, 1881. He graduated at the National Chilean Institute, was engaged there as professor, and became president of the congress in 1841. In 1851 he was elected by the conservatives as president of Chile, in which office he served ten years. During that time he suppressed several rebellions, effected educational and political reforms, and encouraged internal improvements. He was succeeded by President Perez. After retiring from the presidency, he held the office of president of the supreme court until his death. His son, Jorge Montt, is known as an eminent sailor and statesman of Chile. He was born at Santiago in 1847, attained to eminence as a seaman, and on Nov. 6, 1891,

became president of Chile. His administration was one of peace and prosperity.

MOODY, Dwight Lyman, evangelist, born in East Northfield, Mass., Feb. 5, 1837; died there Dec. 22,1899. In his early youth he was employed as a farm hand, later became a salesman in Boston, and at the age of eighteen was converted to the Christian faith. In 1856 he settled at Chicago, where he engaged as salesman, and affiliated with the Plymouth Congregational Church, in which he organized a Sunday school class. Soon after he devoted his usual energy to organizing a mission class among the boys taken from the tenement districts, a deserted saloon constituting the room in which he conducted the work. About that time the Civil War began, and he was engaged by a number of ministers and laymen to carry on missionary work among the soldiers that recruited at Chicago, but later also operated among the sick and wounded at Shiloh, Murfreesboro, and Richmond. In 1865 he became president of the Chicago Y. M. C. A., in whose interest he traveled, and also worked in behalf of Sunday school organization. The association for which he labored constructed a large mission hall for him as a place to give revival meetings, but it burnt in 1871, and, after the great fire, he erected on the same site a building costing $70,000. Ira D. Sankey, a celebrated evangelistic singer, aided him materially in attaining to success, and with him he visited England in 1870 and 1883, where he was as successful as he had been in America. Among the various institutions established by him are the Northfield Seminary for Girls, the Mt. Hermon School for Boys, Farwell Hall, and School for Bible Study at Northfield. Most of these institutions and others were established by funds collected as donations and from the proceeds of the sale of "Gospel Hymns," a work published by him and Sankey. In the Spanish-American War of 1898 he did effective work among the soldiers located in the southern states. Moody was not a trained theologian, but his teachings accorded with those of the orthodox church, and his meetings were always on a union basis. It was his design to inspire men with faith and love by expressing in the plainest of English his favorite theme in relation to the love of God. It is doubtful whether any man of modern times did more than he to promote careful Bible study. Among his writings are "Way of the Word;" "Second Coming of Christ;" "Way of God and How to Find It," and many volumes of sermons.

DWIGHT LYMAN MOODY.

MOON, the satellite of the earth, and classed as one of the secondary planets. It revolves around the earth in an almost circular orbit once each sidereal month, at a mean distance of 238,818 miles. Its least



PHOTOGRAPH OF THE MOON.

distance from the earth is stated generally at 221,593 miles, and its greatest distance at 252,948 miles. So far as known the moon has an equal diameter in all directions, it being calculated by trigonometry at 2,160 miles. The surface area is about one-fourteenth that of our planet, or four and a half times that of the United States. The bulk of the moon is one-forty-ninth that of the earth; the mass about one-eighty-first, and its mean density about one-half. It would require fifty globes the size of the moon to equal the earth, and a body weighing one pound on the surface of the earth would weigh about 2.65 ounces on the moon's surface. All its light is received from the sun; thus moonlight is sunlight reflected from its surface, and owing to its brightness it always appears larger than it really is.

Since the moon turns once on its axis while going once around the earth, the lunar day is equal to twenty-nine and a half of our days, and the same side is always turned toward the earth. As it revolves round the earth it exhibits phases, these depending upon the extent of the illuminated portions that may be seen from the earth. Full moon occurs when it is exactly opposite the sun with the earth between; last quarter when one-half of the illuminated surface, that is, one-quarter of the moon's surface, is seen; new moon when it is between the earth and sun; and first quarter when only one-half of the illuminated portion is again visible. The moon is said to wane from full moon to new moon, and during the other half of its course it is said to wax. Eclipses of the moon and sun are due to the relative positions of the three heavenly bodies. An eclipse of the moon occurs when that body is obscured

either wholly or in part by the shadow of the earth; and an eclipse of the sun when the moon occupies a position between that body and the earth, the former phenomenon being possible only at or near full moon and the latter only at new moon. The sidereal period of the moon, that is, a complete revolution round the earth, is completed in 27 d. 7 hr. 43 min. 11.46 sec.; but the lunar month is longer than the sidereal by 2 d. 5 hr. 51.41 sec., owing to the advance made by the earth in its orbit between two successive conjunctions of the moon.

The closest telescopic examination has revealed no traces of organic life. There appear to be no clouds; no water from which they may be formed, nor an atmosphere to support them. The exposure to the sun's rays for a fortnight and an absence of light and heat on the opposite side for an equal period give rise to great extremes of heat and cold. Being nearer the earth than all other bodies of considerable size, the surface of the moon has been examined carefully by powerful telescopes, and every portion of its surface has been mapped and named by astronomers. Most of the surface visible to us is constituted of mountain chains, valleys, and extensive craters. Ivannus Hevelius (1611-1687), of Dantzic, prepared the first lunar map, in 1647, and since then many photographs and maps have been made. Many of the mountain ranges are connected by chains running across valleys, but there are some isolated mountain peaks and also small clusters or groups of elevations. Some of the craters are from ten to twenty-five miles in diameter, and there are also large crevices and cracks that appear to have been formed by volcanic action. It is thought that there are forty mountain peaks of the moon higher than Mont Blanc. The Leibnitz Mountains are regarded the highest, having elevations from 30,000 to 36,000 feet above the general surface, the whole system greatly exceeding in height any of the terrestrial peaks. The absence of an atmosphere tends to sharply define all objects on the surface, thus making it possible to measure with considerable accuracy the heights of mountains, their extent, the depth of many craters, their diameter, and many of the lunar landscapes.

The names applied to the different mountains, craters, and plains are those of celebrated astronomers and writers; thus, Copernicus is the name of a crater having a diameter of fifty miles, and Eratosthenes is the name applied to one of the most celebrated mountains, having a height of nearly 16,000 feet. Anciently the moon was the subject of many superstitions; the time of planting cereals, beginning buildings, killing animals, pruning trees, gathering the harvest, and even forms of worship were determined by the moon's phases. However, as education spread it became apparent that all these, as well as predictions of the weather and other phenomena on account of the influence of the moon, are relics of ancient superstitions. Writers generally agree that it would take 600,000 full moons to equal in brilliancy the light of the sun, and that, if it has any influence on the weather, it is a slight tendency to produce clear nights at full moon. The most powerful telescopes now constructed are capable of bringing the surface of the moon within forty miles of the eye; thus it is apparent that a close examination of its geography is quite possible.

MOONSTONE. See Felspar.

MOORE, Sir John, general, born in Glasgow, Scotland, Nov. 13, 1761; died Jan. 16, 1809. He was the son of a Scottish physician, entered the army in 1776 for service in Corsica, and later was transferred successively to the West Indies, Ireland, and Holland. In 1801 he accompanied the army to Egypt, where he served under Sir Ralph Abercrombie and was severely wounded, receiving for his gallantry the Order of the Bath. In 1808 he proceeded with an army of 11,000 men to assist the king of Sweden against the allied forces of Russia and France, and in the latter part of that year operated with a large force in Portugal and Spain against Napoleon. He concentrated his forces, which then consisted of 25,000 men, at Salamanca, but was soon compelled to retreat, for the reason that Napoleon had begun to move an army of 70,000 against him. Accordingly he proceeded through the mountain regions during a season of the year when storms made passage almost impossible, but safely reached Corunna. While there the French led an attack under General Soult, but they were repulsed successfully. However, General Moore was wounded severely in the conflict and died immediately after victory attended his efforts. He was knighted in 1805.

MOORE, Thomas, noted poet, born in Dublin, Ireland, May 28, 1779; died Feb. 25, 1852. He was the son of a tradesman, secured an elementary education, and graduated from Dublin University. In 1799 he entered Middle Temple, London, to undertake the study of law, and while there became prominently connected with literary society, a circumstance due to his musical talent. His first literary work was a translation of the "Odes of Anacreon," that appeared in 1800, and soon after followed the "Poetical Works of the Late Thomas Little." Through the influence of Lord Moira he secured the position of registrar of admiralty court at Bermuda,

THOMAS MOORE.

in 1803, an office he immediately accepted. Soon after he appointed a deputy to discharge the duties of that office and entered upon an extensive tour of the United States and Canada, and on returning to England he published his "Odes and Epistles," in 1806. Later he produced his celebrated "Irish Melodies," a work upon which his reputation is founded, though it was not entirely completed until 1834. This production netted him an annual income of $2,000; his "Lalla Rookh" brought him $15,000, and his "Life of Byron" nearly $25,000. However, his deputy in the Bermudas embezzled $30,000 of government funds, and, to escape arrest for debts, he resided for a time in Italy. In 1822 he returned to England and settled at Sloperton Cottage, in Wiltshire, where he resided the last thirty years of his life. Thomas Moore numbered among his warmest friends some of the most eminent literary men of his time, among them Jeffries and Byron. A pension of $1,500 was granted him in 1835. Among his works not named above are "Fudge Family in Paris;" "Loves of the Angels;" "Life of Lord Edward Fitzgerald;" "Life of Sheridan;" "Veiled Prophet;" "Light of the Harem;" "Travels of an Irish Gentleman in Search of a Religion," and "History of Ireland." Both the poetry and prose of Moore are clear, concise, and appropriate in language, and in many instances they reach a high degree of tenderness and majesty of vigor. Some of them have been widely translated. They are still enjoying a marked popularity.

MOORS, a race of people originating from the Mauri, the inhabitants of ancient Mauritania, and who are thought by some writers to be the direct descendants from a class of Berbers known as the Amazirgh. Their language is Arabic, their religion Mohammedan, and at present they inhabit Morocco and the southern Mediterranean coast. In Spanish history the term Moor is used interchangeably with Arab and Saracen, since Mohammedan peoples from North Africa conquered the Visigoths in that country in 711 and governed the conquered part till 1492. Later the Moorish forces invaded France, but were defeated at Tours in 732 by Charles Martel. Moorish culture, industry, art, science, and customs prevailed in Spain for centuries, making that portion of Europe the center of commercial and educational activity while the Dark Ages characterized other parts of Europe.

At length the kingdoms of Castile and Aragon developed superior power under Christian influences, and the Moorish possessions were lost successively until they controlled only the region known as Granada. Their final downfall was effected in 1492 under Ferdinand the Catholic, and the Moors either colonized regions of Africa, or submitted to the Spaniards by adopting their customs and religion. However, revolts occurred at various times, and finally Philip III. expelled the remaining Moors by a decree in 1610. Fully 3,500,000 Moriscos, as their descendants were called, left Spain between 1492 and 1610, thus taking from that country the superior intellect and industry essential in maintaining its commercial, educational, and agricultural importance. This is assigned as the cause of the rapid decline in the importance of Spain, a condition from which that country has not yet fully recovered. The banished Moors established a foothold in the northern portions of Africa, where they founded the states of Barbary, and from their many cities and strongholds conducted expeditions against the Spaniards and other nations of Europe for centuries.

Many traces of Moorish industry and art still remain in Spain. The most prominent of their achievements is witnessed in the architecture still found in abundance in Granada and other parts of the Iberian peninsula in which they had possessions for some time. The Alhambra in Granada is the most notable, and presents an interior of great beauty and remarkable ingenuity, though its outer appearance is not particularly beautiful. Another structure of note is the mosque of Cordova, which was founded in 786, but after Moorish expulsion became converted into a cathedral. There are also remarkable specimens at Seville, notably the cathedral tower that was built in the latter part of the 12th century. See **Alhambra**.

MOOSE. See **Elk**.

MOOSEHEAD LAKE (mōōs'hĕd), the largest body of water in the state of Maine, being thirty-five miles long and from two to thirteen miles wide. It is the source of the Kennebec River, receives the water from several adjacent lakes by the Moose River, and on its eastern shore are several prominent elevations, of which Mt. Kineo, height 4,125 feet, is the most noted. Fine fish are abundant. A railway line along its southwestern shore has stimulated progressive development of the region.

MORAES-BAROS, Prudente Jose de, statesman, born in the state of Sao Paulo, Brazil, in 1845. He graduated at the National University, secured admission to the bar, and was elected to the chamber of deputies as a republican. When Dom Pedro was deposed and the republic proclaimed, in 1889, he was an active supporter of the new government. In 1891 he became president of the senate, and on March 1, 1894, secured an election to the presidency of Brazil to succeed President Peixoto. His administration was marked by a policy devoted to the enforcement of constitutional law, and the material internal development of the republic.

MORAN (mo-răn'), **Thomas**, noted artist, born in Lancashire, England, Jan. 12, 1837. He was brought to the United States by his parents in 1844, studied engraving and painting at Philadelphia, and later devoted some

time to the study of painting in France, England, and Italy. His specialty in early study was landscape painting, and, being imbued with a desire to secure specimens of Rocky Mountain scenery, he was induced to join the United States expedition to the Yellowstone region in 1871. While there he made preparation for his two excellent works, entitled "Chasm of the Colorado" and "Grand Canon of the Yellowstone." These splendid productions were purchased by the government for $10,000 each and placed in the United States capitol. He also acquired a considerable reputation on account of productions in etching. In 1876 several of his paintings were exhibited at the Centennial Exposition, and in 1884 he was made a National Academician. Among his works not named above are "Last Arrow;" "Mountain of the Holy Cross;" "Balboa Discovering the Pacific;" "Ponce de Leon in Florida;" "Children of the Mountain," and "Dream of the Orient."

MORAVIAN BRETHREN, a religious sect founded by the immediate followers of John Huss in Bohemia. They are also called Herrnhuters, from the town of Herrnhut, built by them in Saxony, and which has continued until the present time to be the principal seat of their influence and educational institutions. They are closely allied to the Lutheran Church, but differ from it in church discipline and some minor points of religious doctrine. It is their aim to embrace simplicity in manners and earnest piety, and to pursue the study and practice of religion with great earnestness. As missionaries they have attained to much influence, having stations in nearly all of the principal regions of the continents and many islands. Their schools are highly efficient institutions of learning, and are characterized by the devotion of their teachers and the high degree of morality in culture. Numerically the principal adherents of the Moravian Church are in America, Germany, and England, the total number being estimated at 225,000. In the United States there are 125 churches, with 140 ministers, and 16,950 communicants.

MORAY (mŭr'ĭ), **James Stuart, Earl of,** born in Scotland about 1533; assassinated Jan. 20, 1570. He was the son of James V. of Scotland, became the leader of the Protestant party in 1556, and later was selected as prime minister for Mary Queen of Scots. When the queen married Darnley, in 1565, he opposed that union with much vigor, and even offered armed resistance, but, after a signal defeat, was compelled to seek safety in England. In 1567 he returned to Scotland to become regent while Mary was a prisoner. Subsequently he was made a commissioner to guard the interests of the queen while in custody in England, and willingly agreed to testify against her in the complications that led to the murder of Darnley. His death resulted from a wound received from a shot fired by James Hamilton, who was thought to be acting in accord with the wishes of friends of the queen.

MORE, Hannah, author and philanthropist, born in Stapleton, near Bristol, England, Feb. 2, 1745; died in Clifton, Sept. 7, 1833. She was the daughter of a village school teacher, under whose influence she acquired an early education, and soon developed much ability as a writer of verses. In 1773 she published a pastoral drama, entitled "Search after Happiness," and the following year a tragedy called "Regulus." Her ability as a writer brought her into contact with Garrick, Johnson, Reynolds, and Burke, but her life in London became distasteful to her and she accordingly settled near Bristol. There she developed a taste for serious and practical compositions, many of which attained to much popularity. As a philanthropist she organized a number of schools, aided in founding charitable institutions, and devoted $50,000 of her earnings to benevolent enterprises. Her writings embrace "Fatal Secret;" "Sacred Dramas;" "Shepherd of Salisbury Plain," and "Caleb in Search of a Wife."

MORE, Sir Thomas, author and statesman, born in London, England, Feb. 7, 1478; beheaded July 6, 1535. He was the son of Sir John More, justice of the queen's bench, and became a page in the house of Cardinal Morton, archbishop of Canterbury. He entered Oxford in 1497, where he demonstrated much ability as a student. Afterward he became a student of law, completing the course at Lincoln's Inn. Even as a youth it was said of him, "There is but one wit in England, and that is young Thomas More." His diligent study, both in and out of educational institutions, won for him a profound scholarship, and his earnest piety and good humor made him many friends. A profound student of Latin and Greek, he was supported vigorously by progressive scholars when he championed the introduction of the study of Greek into the universities of England. He had won the lasting friendship of Erasmus while at Oxford, and soon after completing his educational studies was recognized as a leading scholar. With the accession of Henry VIII. to the throne, he was promoted rapidly. He became undersheriff of London, served in parliament, and was made ambassador to Holland. In rapid succession he rose until he became treasurer of the exchequer, was made speaker of the house of commons, and in 1529 succeeded Wolsey as lord chancellor. Not only did Henry favor him politically, but he also showed a friendship for his society, and paid him a number of visits at Chelsea. When Henry sought to divorce Catharine of Aragon, the two became estranged, and, when the monarch formed a marriage contract with Anne Boleyn, he refused to acknowledge its validity.

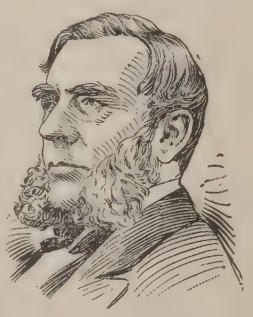
The attack made by Henry upon papal supremacy did not cause More to deviate

from the dictates of his conscience, but he supported the established system of religion. His refusal to take the oath to acknowledge Henry as head of the church caused his imprisonment, and neither the eminence of his position nor his former intimacy with the king saved him from a cruel death. He was accordingly committed to the Tower, tried for treason, and executed. Though imprisoned and endangered, his ready wit did not leave him, a fact nicely illustrated by his statement as he climbed the scaffold to bow beneath the headman's ax, when he said, "I pray you see me safely up; and for my coming down let me shift for myself." The writings that have made Sir Thomas More famous are "Life of Edward V." and "Utopia." The former is written in a most remarkable literary style and is regarded by many as the finest example of good English. The latter was written in Latin, but has been translated by various writers. It is a romantic description of the ideal state of a republic on an island, where the laws, political and social, are in strict accord with philosophical perfection.

MOREAU (mo-rō'), **Jean Victor**, celebrated general, born at Marlaix, France, Aug. 11, 1763; died at Laun, Bohemia, Sept. 2, 1813. He was the son of a celebrated jurist, studied law at Rennes, and became an early advocate of the Revolution. In 1793 he displayed much tact in commanding a battalion of volunteers, and was accordingly dispatched the following year to command an expedition into Belgium and Holland. He became chief commander of the forces on the Rhine and Moselle in 1796, and in the campaign not only drove the Austrians to the Danube but threatened Vienna, and later secured French control of the Rhine countries. In 1799 he commanded the French forces in Italy, where by exceptional strategic power he operated with success against the allied forces of Austria and Russia. However, he was succeeded by Joubert, but, after the death of that general, again displayed rare ability in conducting a retreat of the defeated army into France. The directory offered him the dictatorship of France, but this he declined in order to assist Napoleon. In 1800 he was again placed in command of the army of the Rhine, in which year he won the celebrated battle of Hohenlinden. In 1804 he was accused of being implicated with Cadodal and Pichegru in a conspiracy against Napoleon, and, though there was insufficient evidence, the trial resulted in his exile. Accordingly he came to America and resided for some years on an estate in Pennsylvania. Later he returned to Europe for the purpose of assisting the allied armies in the contest against Napoleon, but in 1813, while on a march to Dresden with the king of Prussia and the czar of Russia, was mortally wounded.

MORELIA (mō-rā'le-ą), a city of Mexico, capital of the state of Michoacan, about 125 miles west of the city of Mexico. It is located in a beautiful valley, has a favorable climate, and is conveniently connected by railways. There are several fine parks, a cathedral, substantial public buildings, and manufactures of utensils, clothing, jewelry, and lumber products. It has a large trade in merchandise. Population, 28,650.

MORGAN, Edwin Dennison, statesman, born in Washington, Mass., Feb. 8, 1811; died in New York City, Feb. 14, 1883. He entered upon a successful business career as a merchant at Hartford, Connecticut, when only seventeen years of age, but later removed to New York City. Soon after he became interested in politics. He was a member of the state senate in 1850-53, became governor of the state in 1858, and personally supervised the equipment of 2,300 soldiers for service in the Civil War. He was United States senator in 1863-69. By strict devotion to business enterprises he became the possessor of much wealth, and, besides supporting many benevolent enterprises, left by will $795,000 to found and support institutions devoted to religion and charity.



EDWIN D. MORGAN.

MORGAN, John Hunt, soldier, born in Huntsville, Alabama, June 1, 1826; slain Sept. 4, 1864. His parents settled in Kentucky while he was yet a child. He volunteered his services at the beginning of the Mexican War, in which he took part as first lieutenant of cavalry. When the Civil War began, he organized a cavalry force for the Confederates, and with it made a number of raids through Ohio, Kentucky, and Indiana. His raid into Ohio in 1863 led to his capture, and he was confined for a time in the Ohio penitentiary at Columbus. Shortly after he made his escape by digging a tunnel under the walls, and immediately organized another raid into Tennessee, where his force was surprised at Greenville and he was shot. His band of troops became known as "Morgan's Guerillas," and was the means of spreading terror through many regions.

MORGAN, Julius Spencer, banker, born in Holyoke, Mass., April 14, 1813; died in Monaco, Europe, April 8, 1890. He entered a business house at Boston when a boy, was employed in a bank in 1834, and later founded a dry goods establishment in Boston. In 1853 he became associated with the banking house of George Peabody in England, which later developed into one of the most important financial establishments of the world. He utilized much of his wealth

in support of religious and charitable enterprises, and gave valuable works of art to the New York Metropolitan Museum of Art. His son, John Pierpont, was born in Hartford, Conn., April 17, 1837. He attended the high school in Boston, studied at the University of Göttingen, Germany, and in 1857 entered a banking house of New York City. Later he formed other important banking relations, became attached to the institution owned in part by his father in London, also to a prominent banking house in Paris, and gave support to many extensive financial and industrial projects. Among many contributions to benevolent and educational purposes is one of $50,000 to establish a free library in Hartford, Conn.

MORGARTEN (mŏr-gär'tĕn), the name applied to a mountain slope in Switzerland, situated in the canton of Zug, near Lake Egeri. It is celebrated for a victory won by the Swiss on Nov. 15, 1315, over an Austrian army of 50,000. The Swiss numbered only 1,400, but they had possession of the narrow pass that winds between the lake and Morgarten Hill, a fact of which their brave warriors took due advantage.

MORGHEN (mor'gĕn), **Raffaelle Sanzio Cavaliere,** noted engraver, born in Florence, Italy, June 19, 1758; died April 8, 1833. He descended from a German family, secured his first training in engraving under his father, but later studied at Rome. After developing his powers, he produced many excellent works of art, and was granted a liberal pension by the government. He was patronized by many of the prominent men of his time, including Napoleon, to whom he dedicated his masterpiece, entitled "Transfiguration," and upon which he devoted care and attention for a period of sixteen years. His various works include 254 engravings, among them being "Last Supper;" "Madonna del Sacco;" "Theology;" "Poetry," and "Madonna della Seggiola."

MORIAH (mō-rī'a), **Mount,** a name applied in the Scriptures to the hill on which Solomon built the temple at Jerusalem. It is a part of the present city, and on it is the great mosque of Jerusalem, a structure that forms one of the principal attractions for the Moslem world. Near Mount Moriah is an intermittent spring known as Virgin's Fountain, from which the water passes by an aqueduct into the Pool of Siloam.

MORLEY (mŏr'lĭ), **Henry,** author and educator, born in London, England, Sept. 15, 1822; died there May 24, 1894. He studied at King's College, London, and in Germany, and later entered upon the practice of medicine. In 1848 he became editor of the "Examiner," contributed extensively to various periodicals, and in 1865 was selected as professor of English literature and languages at University College. After 1889 he devoted his time exclusively to literature and lecturing. His productions include a number of biographies, historical works, translations, and compilations of various important historical and literary writings, all of which have had a wide reading. Among them are "Sketches of Russian Life;" "English Writers before Chaucer;" "Library of English Literature;" "Cornelius Agrippa;" "Journal of a London Playgoer," and "Morley's Universal Literature."

MORLEY, John, author and statesman, born in Blackburn, England, Dec. 24, 1838. He graduated from Oxford in 1859, was called to the bar, but made literature his profession. In 1867 he became editor of the "Fortnightly Review," secured a like position on the "Pall Mall Gazette" in 1880, and from 1883 to 1885 edited "Macmillan's Magazine." During the time he engaged as editor of these periodicals he also edited about forty volumes of a series entitled "English Men of Letters," produced a large amount of original work, and attracted attention as a lecturer. He entered parliament in 1880, where he supported the home rule policy of Gladstone, and in 1886 became chief secretary for Ireland. Morley showed marked ability and exercised much influence in shaping the policy of his party in parliament and before the people, usually taking an independent position, which he maintained with vigor and ability. He gave support to Gladstone in 1890, lost his seat at the general election in 1895, but in 1896 was returned from an election district in Scotland. His writings not mentioned above include "Study of Literature;" "On Compromise;" "Treatises on Voltaire and Rousseau;" "Diderot and Encyclopædists;" "Edmund Burke;" "Collected Works of Morley," and "Struggle for National Education."

MORMONS, or Church of Jesus Christ of Latter Day Saints, a religious organization whose tenets are based upon the Bible and the Book of Mormon. Joseph Smith was the founder of the Mormons, in 1830. In 1820, when Smith was only fifteen years of age, he asserted that the first two persons of the Divine Trinity had communicated with him in person, and had placed upon him the duty of prophesying to the people. Numerous revelations were made to him in the period of 1823-27. In the latter year the golden plates of the Book of Mormon were placed in his hands, and he received two stones in silver bows resembling a pair of spectacles, called the Urim and Thummim, and by looking through them he was enabled to read the contents, while an assistant wrote them in the English language. The original Book of Mormon consisted of golden plates about eight inches in length and seven in width. These plates were constructed of thin sheets, and fastened by three golden rings. The entire volume had a thickness of six inches. However, a portion of its contents was sealed. He received a revelation only of the unsealed part, and the other part was reserved to be revealed when future occasion makes it

essential to the general welfare of man. Smith called the language of the book Reformed Egyptian, and it was claimed that the characters used in the writing were executed elegantly, but of small size.

In 1830 the first edition of the Book of Mormon was published at Palmyra, New York. On the last few pages appeared the testimony of witnesses who claimed to have seen the original book. The testimony consisted of a statement signed by David Whitmer, Martin Harris, and Oliver Cowdery. Its purport was that they had seen the plates from which the book had been translated, and that they had been handed down from heaven by an angel, and supplementary to it was the testimony of eight persons who also witnessed its authenticity. Oliver Cowdery was the associate of Smith and wrote the words as dictated by him, and the eight witnesses included Joseph Smith's father and two brothers. It is asserted that Joseph Smith and the eleven different persons he referred to are the only ones that saw the plates of the original book before they were returned to the angel who had brought them to Joseph. Opponents to the new faith sprang up rapidly, and it was asserted that the money to publish the Book of Mormon was furnished by a farmer named Harris with the view of securing profit. Some claimed that several of the witnesses were induced to make a declaration that their former testimony regarding the authenticity of the original manuscript was untrue. However, converts to the faith were rapid, and a large number of zealous adherents sprang up in various parts of the United States.

The Book of Mormon is so named from Mormon, the prophet who is represented as the historian of his people. The record assumes to give a history in relation to America from the building of the Tower of Babel, and recites that a Jew named Lehi led a band of Israelites from Jerusalem to America about 600 B. C. His son, Nephi, is claimed to be the founder of a race of people that include the North American Indians. It is claimed that Christ appeared to this people after the crucifixion, ministered to them, and established his church. Dissensions among the people led many to forsake the true faith, some embracing idol worship, and at last great contests arose that terminated in a series of battles in New York, the last occurring in Ontario county, in which nearly all followers were exterminated. The prophet Moroni was one of the few survivors, and he it was who wrote a record at that time. The Mormons represent their own tenets as follows: "We believe in God, the Eternal Father, and his Son, Jesus Christ, and in the Holy Ghost. We believe that men will be punished for their own sins and not for Adam's transgression. We believe that through the atonement of Christ all men may be saved by obedience to the laws and ordinances of the Gospel. We believe that these ordinances are: Faith in the Lord Jesus Christ; repentance; baptism by immersion for remission of sins, and laying on of hands for the gift of the Holy Ghost. We believe that a man must be called of God to prophesy and by the laying on of his hands, by those who are in authority, to preach the Gospel and administer the ordinances thereof. We believe in the same organization that existed in the primitive church; apostles, prophets, pastors, teachers, and evangelists. We believe in the gift of tongues, prophecy, revelation, visions, healings, interpretation of tongues, and other miracles. We believe the Bible to be the word of God, as far as it is translated correctly; we also believe the Book of Mormon to be the word of God. We believe all that God has revealed, all that He does now reveal, and we believe that He will yet reveal many great and wonderful things pertaining to the kingdom of God. We believe in the literal gathering of Israel and in the restoration of the ten tribes; that Zion will be built upon this continent; that Christ will reign personally upon the earth, and that the earth will be renewed and receive its paradisic glory. We claim the privilege of worshiping Almighty God according to the dictates of our own conscience, and allow all men the same privilege; let them worship how, where, or what they may. We believe in being subject to kings, presidents, rulers and magistrates, in obeying, honoring and sustaining the law. We believe in being honest, true, chaste, benevolent, virtuous, and in doing good to all men; indeed, we follow the admonition of Paul: 'We believe all things, we hope all things;' we have endured many things, and hope to be able to endure all things. If there is anything virtuous, lovely, or of good report, or praiseworthy, we seek after these things." In 1851 a division was caused by the publication of a revelation authorizing polygamy. According to this revelation two classes of marriages were recognized—one a spiritual and eternal, the other a temporal for this life. Eternal marriages were held to exist as a relationship having no end, while temporal marriages were looked upon as joining the contracting parties until they are divorced by death. Those denying the authenticity of this revelation constitute the Reorganized Church of Latter Day Saints, whose principal seat is at Lamoni, Iowa. Another division of the church occurred in Utah in 1869, when many withdrew from the so-called spiritual priesthood of Melchisedec and organized the Church of Zion.

The history of Mormonism presents many incidents of devotion and endurance. Six members formed the first church at Fayette, Seneca county, New York, on April 6, 1830, but shortly after they removed to Kirtland, Ohio. There converts gathered from various states, and the church was formally

organized in 1833 under the First Presidency. Brigham Young was chosen as evangelist, and in 1835 was also included with the twelve apostles. Missionaries were sent to various portions of the United States and England, but financial troubles in a bank established by them at Kirtland and a series of contentions with opponents caused the Mormons to form a settlement at Independence, Missouri, where nearly all of them located in 1838. Serious contentions caused the governor of the state to order them from Missouri, and they immediately formed a settlement in Hancock county, Illinois, which they named Nauvoo, and within a short time had 15,000 adherents in the settlement. It was while there that some first claimed a revelation regarding polygamy, which aroused much opposition. Disputes regarding taxation under the laws of Illinois also tended to complicate matters.

Joseph and Hyrum Smith were placed under arrest for violations of law, and while in jail at Carthage a mob shot both on June 27, 1844. It was necessary to call out the state militia to quell the disturbances that followed, but Brigham Young, the new leader, organized an exodus in 1846, and led about 1,000 families to the far west. In 1847 they reached the region of Great Salt Lake, where they settled and have since maintained their center of activity. In developing the natural resources of Utah the Mormons have shown much endurance and industry, built many thriving cities, redeemed waste lands by irrigation, constructed vast improvements, and built beautiful schools and homes for worship. In 1853 they laid the cornerstone for a beautiful temple at Salt Lake City, which was dedicated in 1893. It is a magnificent structure of gray granite, is lighted by electricity, contains a fine and substantial finish, and cost about $12,000,000.

MORNING GLORY.

Missionary work has always been an active feature of the Mormon Church. The membership at present includes 375,000 communicants, about two-thirds of them being resident in Utah, and the others in the different states, but particularly in Arizona, Missouri, Nevada, and Idaho. In 1890 President Woodruff issued a proclamation by which polygamy was declared no longer a tenet of the Mormon Church. See **Latter Day Saints.**

MORNING GLORY, a family of climbing plants, including many species. They are familiarly known as favorite flowering plants, and are cultivated extensively in gardens. The vines climb to heights of from ten to twenty feet, and produce funnel-shaped flowers of white, purple, pink, blue, and variegated colors. They are of especial beauty in the morning, when the flowers are full-blown. This family of plants also includes the curious parasitic twiners known as dodders.

MOROCCO (mō-rŏk′ō), one of the capital cities of the kingdom of Morocco, in Africa, the others being Fez and Mequinez. It is situated on a fertile plain, near the Tensift River, and is protected by a wall of stone and earth now in a dilapidated condition. The streets are narrow and unpaved, and the buildings are constructed principally with flat roofs, and mainly of earth and stone. Formerly it was one of the greatest and most flourishing cities of the Moslem world, remains of which still exist, but in the main the city has few traces of former greatness and prosperity. However, its site is one of much beauty and commands a fine view of the surrounding country, and in its vicinity are magnificent gardens, groves, and fields. The city has manufactures of leather, clothing, carpets, earthenware, textile fabrics, and utensils. Its market places are crowded with bazaars. The government palace is an extensive and beautiful structure, and besides it are several public elementary schools and a large number of mosques. Morocco was founded in 1072 by Abubekr ben Omar. Its greatest prosperity was attained in the 13th century, when it was a vast business emporium. At that time it was the seat of learning in northwestern Africa, and contained fully 725,000 inhabitants. Its decline is due to continuous civil strife with peoples of northern Africa and Spain. At present it is showing evidences of returning prosperity and has a population estimated at 60,000.

MOROCCO, a country in the northwestern part of Africa. Its boundary is formed on the east by Algeria, south by the Sahara Desert, and west and north by the Atlantic Ocean and the Mediterranean Sea. It is separated from Spain by the Strait of Gibraltar, and a portion of the southern boundary is formed by the Draha River. There is some uncertainty as to the exact situation of its southern boundary, on account of which the entire area cannot be stated accurately, but the most recent estimates place it at 219,000 square miles. The Draha and Morbeja are the principal rivers, and the drainage is almost exclusively into the Atlantic, only a small portion of the coast plain being drained into the Mediterranean.

All the streams flow rapidly, many of them being characterized by cataracts. The Atlas Mountains trend through the interior, about midway between the coast and the Sahara Desert, forming not only the watershed, but also protecting the coast regions from the hot winds that sweep across the Sahara Desert. The highest peaks are from 10,000 to 13,000 feet above sea-level. In many sections they contain valleys of much fertility and luxuriant vegetation.

Morocco is rich in valuable timber, including cork-oak, esculent oak, cedar, Aleppo pine, and several varieties of palm trees. It contains extensive deposits of rock-salt, iron, copper, gold and silver, lead, antimony, tin, and mineral oils. The coast region has a fertile soil and favorable climate, but in many portions the summer heat is intense, and in some parts irrigation is necessary, but there is an abundance of small mountain streams that supply the necessary quantity of water for that purpose. Among the agricultural products are tobacco, cotton, wheat, rice, barley, maize, sugar-cane, hemp, and many varieties of tropical fruits, including the fig, orange, lemon, pomegranate, and the vine. Large herds of domestic animals are reared, especially in the pastoral regions, the principal varieties being cattle, sheep, camels, goats, asses, mules, and Moorish horses. Field labor is done mostly by oxen and bulls, and transportation by the camel. The country has developed important manufactures of leather, and also considerable productions of Fez caps, pottery, embroidery, carpets, cotton and woolen goods, edged tools, and utensils. Commercial relations are sustained with most of the European countries. Much of the internal trade is in the hands of Jews and Europeans, while transportation is effected by caravans and coasting vessels.

The history of Morocco begins with Berber occupation, these people being the earliest inhabitants, and anciently the country constituted a part of Mauritania. It was annexed to the Roman Empire in 43 A. D., was conquered by the Vandals in 429, and in 533 became a dependency of the Eastern Empire. In the latter part of the 7th century Mauritania came into possession of the Arabs, and since 680 it has been largely in possession of that people and others of the Mohammedan faith. Edris ibn Abdallah, in 787, founded the kingdom of Fez, and the city of Fez was begun in 807. In 1648 the present dynasty was founded, succeeding various independent monarchies that originated from a division resulting after securing independence from the caliphs of Bagdad. During the 18th century the Barbary influences maintained a widespread slavery of Christians, but that institution was abolished in 1814, and in 1817 piracy was forbidden. Abd-el-Kader conducted a war against France in 1844, and in 1859 a war occurred between Morocco and Spain, the latter terminating by a cession of land south of the Draha River. The total population is estimated at 9,400,000, of which 3,000,000 are Berbers and Tuaregs; 3,000,000 Mued Arabs; 2,200,000 Shellah Berbers; 700,000 Bedouin Arabs; 200,000 Negroes, and 150,000 Jews. The remainder is made up of mixed races, including several thousand Europeans.

Nearly all the people of Morocco are Mohammedans, there being only about 5,000 Christians. The government is an absolute despotism, and the sultan is the head of both civil and religious law. Since 1894 Mulai-Abd-el-Aziz has been the reigning sultan. He administers the laws with the support of an advisory cabinet, consisting of the grand vizier, chief chamberlain, administrator of customs, treasurer, and ministers of the interior, foreign affairs, and war. There is a standing army of 12,000 men, a navy of six small vessels, and several strategic points of defense are quite well fortified. Fez is the principal city and main seat of government, but there are connected governmental influences at Morocco and Mequinez. Tangier and Ceuta are cities on the Strait of Gibraltar. The former has a population of 30,000, and the latter of about 10,000. Both these cities have important export and import trade relations with Eurasian ports.

MOROCCO. See **Leather.**

MORPHEUS (môr'fūs), in Greek mythology, the son of Hypnus and god of dreams. Homer describes the house of dreams as having two gates, one of ivory and the other of horn. From the former issue all deceptive and flattering visions, and through the latter proceed those dreams that are fulfilled. Morpheus is represented either as a youth or an old man with wings, bearing in one hand a cluster of poppies, and is in the attitude of scattering the seeds of that sleep-producing plant over the eyes of weary mortals as he moves with noiseless footsteps over the earth.

MORRIS, Gouverneur, statesman, born in Morrisania, New York, Jan. 31, 1752; died Nov. 6, 1816. He graduated from Columbia College in 1768, was admitted to the bar in 1771, and in 1777 entered the continental congress, where he became a supporter of the Declaration of Independence and a leader in financial affairs. From 1781 to 1784 he served with Robert Morris as superintendent of the national finances, and in 1787 was a delegate to the convention that prepared the United States constitution. In 1791 he was on a mission in England, and served till 1794 as minister to France. He was a United States senator from New York in 1800-03, and from 1810 till his death served as a New York canal commissioner. Morris was a man of poetical genius, possessed marked eloquence as an orator, and manifested lofty feelings in private and public life. Jared Sparks published his life and correspondence.

MORRIS, Sir Lewis, poet and states-

man, born in Caermarthen, Wales, in January, 1833. He first attended Sherborne School, and in 1855 graduated from Oxford. Three years later he was called to the bar, entered upon the practice of law, and in 1881 became secretary of the University College of Wales. His political influence was thrown in favor of Gladstone's home rule policy for Ireland. In 1880 he served on an important commission to inquire into the higher education of Wales. Three series of poems, entitled "Songs of Two Worlds," were his first productions, these appearing in 1871-75, which have since gone through a large number of editions. His writings are of such value that Queen Victoria granted him a jubilee medal, and in 1895 the honor of knighthood was conferred upon him. His later writings include "Epic of Hades;" "Ode of Life;" "Songs of Britain;" "Ode on the Queen's Jubilee;" "Visions of Saints," and "Songs Without Notes."

MORRIS, Robert, financier and patriot, born in Lancashire, England, Jan. 20, 1734; died in Philadelphia, Penn., May 8, 1806. His parents brought him to America in 1747 and settled at Philadelphia, where he entered a counting-house and later formed a business partnership. He was one of the early opponents of the stamp act, was elected a member of congress in 1775, and there signed the Declaration of Independence. In 1777 he became identified with the management of the colonial finances, serving at first as an aide to the committee of ways and means, and in 1781 was elected superintendent of finance. He established the Bank of North America in 1782, thus extending the credit of the colonies, and placing the finances upon a creditable basis. In 1784 he retired, but later served in the Pennsylvania legislature, was a delegate to the constitutional convention in 1787, and from 1789 to 1795 was a United States senator. He was offered the office of secretary of the treasury while senator, but declined, and in the latter part of his life became unsuccessful in business on account of speculation, and was at one time imprisoned for debt. Morris was able as a writer and influential as a public speaker.

MORRIS, William, poet and art worker, born at Walthamstow, near London, England, March 24, 1834; died Oct. 3, 1896. He was educated at Marlborough College and at Oxford, graduating at the latter institution in 1856. His college instruction included advanced training in architecture and painting, but soon after he devoted most of his time to literary work, though he was interested in the manufacture of stained glass, wall papers, and art fabrics. In the manufacture of stained glass he was joined by Burne-Jones, Ford Madox Brown, and Dante G. Rossetti, and in conjunction with them contributed in reforming public taste for various designs and colors. His first volume of poems appeared in 1856 under the title, "Defense of Guinevere and Other Poems," a series of lyrics that have grown in popularity as they have been studied by readers of imaginative taste. The long narrative poem, "Life and Death of Jason," appeared in 1867, and constitutes a production that will perpetuate his name. Morris was not only a poetical writer of vigor, but also established a wide reputation as a lecturer on sociology and allied economic subjects. His writings are characterized by a vivid imagination and beautiful gems of thought, and enjoy a wide popularity. Among his more recent productions are "Earthly Paradise;" "Fall of the Niblungs;" "Poems by the Way," and "Story of Sigurd of Volsung." His works in prose include "Dream of John Ball;" "Hopes and Fears for Art," and "News from Nowhere." He also translated Homer's "Odyssey;" Virgil's "Æneid," and some of the Icelandic Sagas.

MORRISON (mŏr'ĭ-sŏn), **Robert,** noted missionary, born in Northumberland, England, Jan. 5, 1782; died in Canton, China, Aug. 1, 1834. He secured a liberal education, and, after engaging with the London Missionary Society, was sent to China in 1807. Under his operations arose some of the earliest Protestant missions in eastern Asia, and he also distinguished himself by translating the Bible into the Chinese language, completing this laborious task in 1818. The production of a Chinese dictionary occupied his attention for a period of about fifteen years, which he completed in 1823. This work involved consulting fully 10,000 volumes of standard books in the Chinese. It was translated into Japanese, and, though subsequently revised, still forms a standard of both the Japanese and Chinese. In 1824 he returned to England, where he was received with distinguished honors, and made a valuable addition to the University College in London by presenting that institution with his Chinese library. Soon after he returned to his field of operation in China, his death occurring while serving as interpreter to Lord Napier.

MORRISON, William Ralls, statesman, born in Monroe county, Illinois, Sept. 14, 1825. He graduated at McKendree College, served during the Mexican War as a private, and after the conclusion of peace devoted his attention to the law practice. He served three consecutive terms in the Illinois legislature. When the Civil War began, he organized a regiment, and was severely wounded at Fort Donelson. While still in the service he was elected as a democrat to congress in 1863. He served in congress from 1873 to 1887, acting from 1873 to 1875 as chairman of the ways and means committee. President Cleveland appointed him to the interstate commerce commission, in 1887, of which he served as a member for a long period of years. Morrison ranks as an advocate of tariff reform, and was an able and forcible public speaker.

MORRISTOWN, county seat of Morris county, New Jersey, thirty miles west of New York City. It is beautifully situated at an elevation of 500 feet above sea-level, has important railroad and electric car connections, and is the home of many business men of New York. The surrounding country is fertile, producing large quantities of cereals, fruits, and dairy products. There are manufactures of paper, machinery, hardware, textiles, and wearing apparel. It is the seat of a fine courthouse, an orphans' home, and a state asylum for insane; the last named institution is one of the finest structures in the United States, costing about $2,650,000. The city has excellent public schools, several seminaries, Saint Elizabeth's Convent, and a public library of 15,000 volumes. Washington made Morristown the headquarters of the continental army during a part of the Revolution. The Ford mansion occupied by him is still standing, and is now the property of the State Historical Society. Population, 1900, 11,267.

MORSE, Samuel Finley Breese, artist and inventor, born in Charlestown, Mass., April 27, 1791; died in New York City, April 2, 1872. In 1810 he graduated from Yale College, studied painting with Benjamin West in London, England, and in 1813 was awarded a gold medal by the Adelphi Society of Arts for his sculpture, "Dying Hercules." He returned to New York in 1815, where he was made president of the National Academy of Design, serving from 1826 to 1842. In 1835 he was elected professor of the arts of design in the University of New York, and while there devoted much attention to chemistry, galvanism, and electricity. His first conception of a magnetic telegraph was formed in 1832; three years later he was able to operate a line stretched in his room representing nearly a mile of wire, and in 1837 made an exhibit of his invention to congress. In 1843 congress finally appropriated $30,000 to establish a line between Washington and Baltimore, which was tested successfully in 1844, the election of James K. Polk as president being the first news of importance communicated from Washington. An effort to secure a patent in England and aid in America cost him all the means at his disposal, but when his invention became practically applied honors rarely equaled were bestowed upon him, and much wealth resulted from his efforts. In 1842 he tested successfully a submarine telegraph in New York harbor, and the following year suggested the feasibility of a Trans-Atlantic line of communication. His system of telegraphy became rapidly adopted in all the civilized countries, and in 1857 ten of the principal countries of Europe sent representatives to Paris, who voted him a gift of $80,000. At present telegraph lines are found in all countries of the world, and the inventions of Morse still constitute the principal apparatus, though the recording instrument has been succeeded quite generally by the sound system. Morse also came in contact with Daguerre in Paris, and, after returning to America, produced the first daguerreotype apparatus made in this country.

SAMUEL F. B. MORSE

MORTAR. See **Artillery.**

MORTAR. See **Cement.**

MORTON (môr'tŏn), **J. Sterling**, statesman, born in New York, April 22, 1832. He descended from Scottish ancestry, graduated at Ann Arbor, and later took a course of law in New York City. After serving as a successful newspaper man in Detroit and Chicago, he settled at Bellevue, Nebraska, where he was elected to the territorial legislature in 1855. In 1858 he was territorial secretary, and soon after became acting governor. President Cleveland appointed him secretary of agriculture in 1893. Morton is the originator of Arbor Day, a day celebrated in many of the states by appropriate exercises and tree-planting, under which many regions of the country and school grounds have been improved by the planting and culture of shade and ornamental trees. He died April 27, 1902.

MORTON, Levi Parsons, statesman and financier, born in Shoreham, Vermont, May 16, 1824. After receiving an education, he became a clerk in a mercantile establishment. Later he formed a partnership in a similar firm at Boston, and afterward in New York City. In 1863 he founded a banking house in New York, and soon after a like institution in London, two establishments that were fiscal agents of the United States in 1873-84. He served in congress as a republican in 1878-81, and became minister to France in the latter year, serving till 1885. In 1888 he was elected vice-president of the United States, and in 1894 became governor of New York. Morton holds a high rank among the orators and statesmen of the United States, and during his active political life exercised a far-reaching influence in the affairs of the state of New York.

LEVI P. MORTON

MORTON, Oliver Perry, statesman, born in Wayne county, Indiana, Aug. 4, 1823; died Nov. 1, 1877. In 1838 he secured a position with a hatter. During his service he saved enough money to defray the expenses of attending Miami University four years, and subsequently he took a law course at Centerville, entering upon the practice of law in 1847. In 1852 he became circuit judge, was an active organizer of the newly formed republican party, and in 1860 was elected as lieutenant-governor of the state. On the resignation of Gov. Henry S. Lane to serve in the United States senate, Morton became the governor, an office he filled throughout the Civil War. His vigorous energy in supporting the Union cause by equipping and forwarding troops led the republican members of the legislature to abandon that body, thus leaving their opponents without a quorum, but Morton continued to manage the state government without a legislature. He borrowed the necessary funds to equip forces upon his own responsibility, but subsequently the state assumed the obligations that he incurred, and in 1864 he was reëlected governor. He served from 1867 to 1877, in the United States senate, where he became noted as one of the most energetic members of his party, serving on important committees and strongly influencing the policy of his party. He also ranks as an active advocate of the impeachment proceedings against President Johnson.

MOSBY (mōz'bĭ), **John Singleton**, guerilla soldier, born in Powhatan county, Virginia, in 1833. He studied at the University of Virginia, was admitted to the bar of that state, and in 1861 entered the Confederate service under Gen. Joseph E. Johnston. In 1862 he secured command as a scout of a force of volunteers with which he made devastating raids into the loyal states, many of which were notoriously disastrous to the Union cause, and for efficiency in that line was made colonel. At the suggestion of General Grant, Mosby and his forces were treated as belligerents, an act which he regarded with such a grateful spirit that he joined the republican party. President Hayes appointed him as consul to Hong Kong, but he was removed by President Cleveland. He published "War Reminiscences" and a number of articles in periodicals.

MOSCOW (mŏs'kō), an important commercial and manufacturing city of Russia, formerly its capital. It is situated on the Moskwa River, in the government of Moscow, 402 miles southeast of St. Petersburg, and constitutes one of the most important railroad centers of Russia. A wall twenty-six miles in circuit surrounds the city, and in its center is the citadel known as the Kremlin, which forms a formidable stronghold. The citadel has connected with it several palaces, including the historic palace of the czars; the Cathedral of St. Michael, the Church of the Enunciation, the Cathedral of the Assumption, the tower of Ivan Veliki, and several other historical structures. All these buildings are richly ornamented with mosaics and fine decorations. The great tower is especially noteworthy, dating from 1600, and towering to a height of 270 feet. Within the Kremlin are about 800 cannon captured from Napoleon in 1812; a great decorative cannon, and a colossal bell weighing 200 tons. The latter was broken in an endeavor to place it in the tower. It has been said that Moscow is remarkable for two things—a cannon which has never been fired and a bell which has never been tolled.

On the outside of the Kremlin are other buildings of general interest, among them the historical museum, the Cathedral of St. Basil founded in 1554, and the Imperial University, established by Empress Catherine in 1755. This university is attended by 4,500 students, has advanced courses of study, fine supplies and apparatus, and a library of 200,000 volumes. There is also a valuable library of 300,000 volumes in the public museum, and in connection with it are fine collections of art and science work. The city has thoroughly organized public schools, extensive systems of street railways, public waterworks, electric lighting, substantial pavements, and splendid boulevards, parks, and monuments. There are important manufactures of woolen, silk, and cotton goods, machinery, leather, furniture, spirituous liquors, metallic products, ironware, engines, paper, and earthenware. The commercial trade extends to all parts of Russia and bordering countries, and represents a vast industry. It is not only on the commercial route between St. Petersburg and the Black and Caspian seas, but is also important because of its situation on the trans-continental railway line.

The history of Moscow dates from the 12th century, having been founded in 1147 by Yuri Dolgoruki. At that time it was strongly fortified, but the Mongol incursions caused it to be sacked in 1237 and again in 1293, but later the Russian influences became more strongly established and it was made the capital of Muscovy. The Lithuanians made attacks upon it at various times in the 14th century, and in 1381 it was conquered by the Tartars. The Crimean Tartars again occupied it in 1591 and the Poles in 1610. Peter the Great removed the capital from Moscow to St. Petersburg in 1713. In 1812 it was abandoned and burned by its own people to prevent its occupation by the French under Napoleon as winter headquarters. Subsequently the city has been improved until it takes rank as one of the most substantial and wealthy cities of Russia, being excelled in size only by St. Petersburg. Population, 823,765.

MOSELLE (mo-zĕl), a river of Europe, an affluent of the Rhine. It rises in the Vosges

Mountains of France, flows northwest to Nancy, and thence crosses into Germany and joins the Rhine at Coblentz. Its course is generally tortuous. The total length is 350 miles, of which about one hundred miles are navigable. The valley of the Moselle is highly fertile, and is noted for its production of aromatic and sparkling wines. Among the cities on its banks are Metz, Coblentz, Toul, and Treves.

MOSES, celebrated law-giver and prophet of the Israelites, born in Egypt, probably at Heliopolis, about 1600 B. C. His birth occurred at the time that the Hebrew people were resident in Egypt, where they were oppressed under the laws of Pharaoh. He descended from the tribe of Levi, his father being Amram and his mother Jochebed. An edict proclaimed by Pharaoh required that the Hebrew children of male persuasion should be executed at birth, and to save his life his mother placed him in a basket of bulrushes and hid him among the rushes of the Nile, where he was cared for by his sister, Miriam. When the king's daughter, Thermuthis, came to the river to bathe, she found the child in the basket, and, being impressed by his beauty, caused him to be taken to the king's palace and adopted as her son. His mother, Jochebed, was appointed as the nurse, and his education was in the princely rank for the priesthood. Moses was early imbued with the hope of Hebrew liberation, and, when he slew an Egyptian while defending a fellow Hebrew, it became necessary for him to seek safety in the wilderness. For forty years he kept flocks of sheep on the pastoral lands, where he was promised by God that his race should be liberated, and also given power to perform miracles in order to prove his mission to the Egyptian authorities.

Moses was slow in speech, but in his effort for liberation he was joined by his elder brother, Aaron, who possessed considerable eloquence. At the age of eighty years he began to organize for the great exodus from Egypt. By exhibiting many miracles and visiting Egypt with ten destructive plagues it became possible to induce Pharaoh to allow the departure of the Hebrews. The people and their effects were conducted safely across the Red Sea under the direction of Moses, but when Pharaoh pursued them to require their return both he and his army were drowned in the waters that swept over them. For forty years Moses conducted the pilgrimage in the wilderness, exhibiting rare ability in avoiding conflicts with hostile peoples, overcoming jealousy among the different tribes, and by many miracles attested his divine mission.

The Ten Commandments were delivered by God while the Hebrews were encamped at Mount Sinai. Laws for the regulation of the domestic and religious life were established, and the people became enlightened by prophecies and instruction in government. At one time the distresses weighed so heavily upon him that he allowed a murmur to escape against his God, and accordingly was punished by being forbidden to enter the promised land. Moses then appointed Joshua as his successor, ascended Mt. Nebo, from which he viewed the heritage of Israel, and on that mountain found an unknown grave. His life is naturally divided into three periods—the first forty years including his education and defense of the Hebrews in Egypt; the second including forty years of pastoral life in the desert, and the last forty years embracing his wanderings with the Hebrews in the wilderness. A full account of the children of Israel is given in the five books of Moses.

MOSQUE (mŏsk), the name applied to a place of Mohammedan worship. The style of architecture employed in these structures is of Saracen origin. There are three essential parts common to all the more important mosques. These include the mihrab, the maksura, and the mimbar. The mihrab is a place of prayer that indicates the direction of Mecca; the maksura is a place for the preservation of the Koran; and the mimbar is a kind of pulpit. Another requirement is a form of tower called the minaret, which serves as a place from which the hour of prayer is announced by the Imam. In the larger mosques there are often from four to six minarets, thus serving to accommodate large congregations.

MOSQUITO (mŏs-kē'tō), the common name applied to various two-winged insects, belonging to the gnat family. They are supplied with a long proboscis that serves to draw subsistence from animals and plants. The proboscis consists of six distinct slender pieces united at the base and protected by a sheath-like labium, capable of puncturing the skin of man and various animals to suck blood. However, the male of the mosquito feeds mostly on plant juices, while the female depends more largely on attacking the different classes of animals and man. Most of the different species, of which there are several hundred, have long bodies and legs, and when flying make a buzzing sound by means of rapid motion of the wings. The female fastens the eggs by means of a sticky substance to objects in stagnant water, and the young are hatched in a few days. They are about half an inch long, and, after remaining in the larva state about three weeks, pass into the pupa state. In this state they are smaller in size, take no nourishment, and soon after the fully developed mosquito is matured. The species found in tropical countries are usually of large size, but there are various species in the high latitudes, even in the polar regions. In some of the marshy regions great multitudes of mosquitoes are born in rapid succession and prove a noxious pest, while in temperate zones they appear most abundantly during the rainy seasons of the warmer

parts of the year. Peoples advanced in civilized arts protect themselves by excluding the pests from dwellings by means of screens and nets, while savages use smoke as a preventative, and also coat the exposed portions of the body with an oil obnoxious to the insect.

MOSQUITO TERRITORY, or **Mosquitia**, a region of Nicaragua, extending along the coast of the Caribbean Sea, and formerly a kingdom under British protection. The region was discovered by Columbus in 1502, and claimed by Spain as dependent territory until 1660, when the British secured a protectorate, but they ceded it to Nicaragua in 1859, and in 1860 it was formally annexed by treaty to the Nicaraguan Republic. The inhabitants number about 16,500. They are made up largely of Negroes and Indians, and support themselves by rearing cattle, agriculture, hunting, and fishing. The coast regions are swampy, but the interior is mountainous and has a healthful climate. Bluefields is the capital and chief city.

MOSSES (mŏs'es), an extensive order of flowerless or cryptogamous plants, widely distributed in all regions, but most common in districts of the temperate zones where moisture is plentiful. There are several thousand species, all of which are of small size, the largest rarely exceeding a foot in height. These plants are made up of a stem with distinct leaves, and roots that grow out from the different portions of the plant. They are propagated either by spore-cases that open by a terminal lid and contain spores unmixed with elaters, or by fusiform bodies containing minute roundish particles. Mosses propagate most abundantly in airy but cool and moist woods, where they appear upon the trunks of trees, on mountain sides, roofs of houses, and in high latitudes on the ground. Bogs are formed by mosses growing in moist places, those found at the surface at present being only a continuation of plant-life that has existed many thousands of years, the older portions dying as the new spring into existence. They are of utility in protecting the roots of plants from cold and drought, while some forms supply valuable foods to animals, such as the reindeer, elk, and others of high latitudes. The name is applied also to other cryptogamous plants, such as Iceland moss, and even to small matted flowering plants. However, the so-called Irish moss is a seaweed.

MOTHS (mǫths), the name popularly applied to numerous lepidopterous insects, but which are distinguished from butterflies in that the antennæ taper to a point and do not terminate in a knob. There is also the difference that they fly during the night or during twilight. They are less brightly colored than butterflies, and when at rest fold their wings flat instead of erect, as do the butterflies. This class of insects includes many varieties, embracing forms so small as to be scarcely visible up to the owlmoth of Brazil, which measures fully ten inches from wing to wing. To the moth family belong those insects that in a caterpillar stage feed on plants, fur, and clothes, such as the carpenter moth or borer, the plume moth, the

WINGED MOTHS.

clothes moth, the hop-vine moth, and the wheat moth. Some writers have designated a large number as millers, while others have confined the moth family to those that subsist on fur and cloth. The only species of utility to man are those known as silk moths.

MOTLEY (mŏt'lĭ), **John Lothrop**, diplomatist and historian, born in Dorchester, now a part of Boston, Mass., April 15, 1814; died in Dorsetshire, England, May 19, 1877. He graduated at Harvard University in 1831, studied at the German universities of Göttingen and Berlin, and, after traveling in Europe, returned to America in 1834. Shortly after he was admitted to the bar, but soon engaged in literary work. His first writings included "Morton's Hope" and "Mary Mount," two novels that proved unsuccessful, and in 1846 he began the celebrated work that made him famous, entitled "The Rise of the Dutch Republic." This work was published after the labor of ten years had been devoted to the task, much of it in Germany and Holland. It was translated soon after into German, Dutch, French, Russian, and several other languages. Subsequently he developed this noted work into the "History of the United Netherlands," which appeared in four vol-

JOHN L. MOTLEY.

umes, the last being published in 1868. While preparing his history he contributed extensively to the "Atlantic Monthly," "North American Review," and "London Times." At the time the Civil War was in progress in America, he contributed to the last named publication for the purpose of giving the English people a correct view of the issues involved in the contest. President Lincoln appointed him United States minister to Vienna in 1861, in which position he served till 1867, and in 1869 became minister to England, but was recalled the following year. The last work published by Motley is the "Life and Death of John Barneveld." George William Curtis edited his correspondence and published it in two volumes. Among his writings are "Causes of the American Civil War;" "Morton's Hope," and "History of the Thirty Years' War."

MOTT, Lucretia Coffin, philanthropist, born in Nantucket, Mass., Jan. 3, 1793; died near Philadelphia, Penn., Nov. 11, 1880. She married John Mott, a Quaker abolitionist, in 1811, and in 1819 became a minister and advocate of the Quaker doctrine, displaying much eloquence in support of temperance and abolition. In 1833 she assisted in organizing the American Anti-Slavery Society at Philadelphia, and devoted much time to the dissemination of the doctrine of woman suffrage.

MOUND BUILDERS, the name applied to a prehistoric race of North America, of which remarkable remains have been found

MOUND AT MARIETTA, OHIO

in various portions of the continent, especially in the Mississippi valley, the state of Washington, and in Yucatan. Knowledge of the existence of any remains of these peoples was not attained until some time after permanent settlements had been made and trade with the Indians had been established. Students of antiquity have ascribed the origin of the remains commonly found to a more or less civilized class of people who were the ancestors of the American Indians, though some writers think that they are the product of a race of people with superior intellect, but who were later exterminated by climatic conditions or by savage tribes. The remains consist mostly of extensive earthworks, and in many of them weapons and tools of stone and copper have been found. There are traces which indicate that some of the earthworks were for defensive purposes and others for habitations, while still others served as temples and places of burial. About 200 mounds were excavated in 1845-47 with the view of establishing at least some knowledge of the builders and their degree of civilization. The results of these researches were published by the Smithsonian Institution, and constitute the most authentic data at present available. It is learned from them that many of the mounds are from a hundred feet to several miles in length, and from five to twenty-five feet in height, though several of the larger mounds are from seventy-five to one hundred feet high.

Many of the works attributed to the moundbuilders are in the form of rectangles, some are square, others circular or polygonal, and still others are in the form of different animals. One of the last named class was discovered in Adams county, Ohio, which had the form of a serpent, with a height of five feet and a length of 1,000 feet. At Newark, Ohio, is a group of mounds that consists of elaborate earthworks in the form of circles, octagons, and squares, and encloses an area of about four square miles. In the state of Washington many mounds have been discovered, but in British America they are exceedingly rare, while those found in Yucatan give evidence of remarkable age. Writers have divided the mounds into six different classes, according to the purpose for which they were constructed, embracing sacred enclosures, sacrificial mounds, defensive mounds, sepulchral mounds, temples, and effigy mounds. The sacred enclosures are thought to contain the remains of deified objects; sacrificial mounds give evidence that sacrifices were offered in the presence of fire on altars; defensive mounds seem to indicate fortifications by reason of underground passages; sepulchral mounds were used for the burial of the dead; temples are those adorned with relics that indicate their service during worship, and effigy mounds are those that were constructed in the form of animals, such as reptiles, mammals, tortoises, birds, and even man. The skeleton remains indicate that the dead were laid to rest side by side in rows, but the great antiquity of the mounds has made it impossible to find entire bones in a fair state of preservation, a fact that has led antiquarians to attribute the construction of the mounds to a period about 1,800 years ago.

In some of the mounds pottery of fine construction was discovered. They also contained lamps, basins, tobacco pipes, rings, copper ornaments, arrow heads, needles of ivory, beads of mica, and copper tools. The remains of this character indicate that the moundbuilders were not only superior to the American Indians when discovered by Columbus, but also to the primitive peoples of Europe. The age of many of the mounds is attested by the presence of large trees

growing on their sides and at their tops, and also by the fact that none of the Indian traditions in any way relate to the origin of the mounds. A mound found in the Little Miami valley gave evidence, when investigated, that fully 1,200 persons had been buried there, thus attesting that the mound-builders were numerous, while the extent of their defensive embankments in various portions of West Virginia, Wisconsin, Iowa, Washington, and other regions is proof that their enemies were numerous and powerful. However, the history of these people is wrapped in doubt, and their study is one of intense interest.

MOUNDSVILLE, a city in West Virginia, county seat of Marshall county, on the Ohio River, ten miles south of Wheeling. It has connections with other trade centers by railway and steamboat lines, is surrounded by a farming region, and has good county and municipal buildings. Among the manufactures are glass, brick, boots and shoes, textiles, cigars, and clothing. Near it is a mound about 900 feet in circumference, dating from the moundbuilders. Population, 1900, 5,362.

MOUNTAIN, an elevation of earth and rock rising higher above the surface of the earth than a hill, and which usually constitutes one of a chain, group, or system, though there are mountains that exist singly. Mountains owe their origin to volcanic action, whereby certain regions became elevated and others depressed. However, some systems originated from subterranean movements extending over long periods of time, and to a wearing away of a portion of the surface by the action of water. Mountains are important as they affect the climate, the higher elevations being subject to a lower temperature than regions nearer the level of the sea, thus modifying the temperature, affecting rainfall by bringing the moisture of the atmosphere to the dew point, and also forming the principal sources of rivers. They are powerful factors in determining the location of towns and forests, contain a large part of the mineral wealth, and form the principal watersheds. The height of mountains is determined most accurately by surveying instruments in which trigonometry supplies the necessary formulæ, but it may be calculated by observing the boiling point of water by means of the barometer. The highest mountain of Asia is Mount Everest, 29,002 feet; South America, Aconcagua, 23,910 feet; North America, Wrangel, 19,500 feet; Africa, Kilimanjaro, 19,680 feet; Europe, Elbruz, 18,570 feet; Australia, Kosciusko, 7,308 feet.

MOUNTAIN ASH, or **Rowan Tree**, an ornamental tree native to the northern United States and Europe, including a number of species. It has pinnate leaves, cream-white flowers, and scarlet berries with yellow flesh. The different species abound principally in mountainous districts, where they attain a height of from ten to thirty feet, and bear a wood of value for its compactness and durability. The berries are an attraction for birds as a food. Mountain ash is cultivated extensively in gardens as an ornamental tree, and for ornamenting avenues in cities.

MOUNT CARMEL, a town of Northumberland county, Pennsylvania, situated twenty-eight miles east of Sunbury. It is surrounded by a productive anthracite coal region. The town has important railroad connections, good schools, and many municipal facilities. It has a growing trade in merchandise. Population, 1900, 13,179.

MOUNT CLEMENS, a city in Michigan, county seat of Macomb county, twenty miles northeast of Detroit. It is surrounded by a fertile agricultural country, has mineral springs of value for invalids, and is the junction of several railroads. Among its buildings is a fine courthouse. It has manufactures of cigars, ironware, salt, furniture, machinery, and lumber products. The city has fine schools, numerous churches, a public library, and many municipal facilities. Population, 1900, 6,576.

MOUNT DESERT ISLAND, an island lying one mile off the coast of Maine, and belonging to Hancock county. It is about twelve miles wide and fifteen miles long. The island has a mountainous surface, and is noted as a fashionable resort. It contains several fine villages, extensive hotel facilities, and productive fisheries. Population, 1900, 5,670.

MOUNT STERLING, county seat of Montgomery county, Kentucky, located twenty-six miles east of Lexington. It has a growing trade, important municipal facilities, and manufactures of flour, cotton and woolen goods, furniture, machinery, and utensils. It contains a public library and has a military school. Population, 1900, 3,561.

MOUNT VERNON, the home and burial place of George Washington, situated in Fairfax county, Virginia, on the Potomac

MOUNT VERNON.

River, about fifteen miles below Washington. Several thousand acres of land were included in the original estate. Lawrence Washington built a house of wood, ninety-six feet

long and two stories high, which he named in honor of Admiral Vernon, his commanding officer while serving in the West Indies, and later the estate passed to George Washington. The residence was improved later, and after his death came into possession of John A. Washington. In 1858 the Ladies' Mount Vernon Association purchased the house and 200 acres of land for the purpose of keeping it as a place of public interest. Washington's library and bedroom are still preserved in the form in which he used them, and many visitors go there annually to inspect this historic place.

MOUNT VERNON, a city in Illinois, county seat of Jefferson county, about seventy-five miles southeast of East St. Louis. It is at the junction of several railroads, and has a growing trade in fruits, cereals, and merchandise. Electric lights, waterworks, and telephones are among the improvements. It is the seat of a modern courthouse, a public library, and several fine school and church buildings. Population, 1900, 5,216.

MOUNT VERNON, county seat of Peyso county, Indiana, located on the Ohio River. It is conveniently connected by railroads, has important municipal facilities, and manufactures of machinery, utensils, and earthenware. The city has several fine schools and churches. It has telephones, electric lights, and a modern courthouse. Population, 1900, 5,132.

MOUNT VERNON, a city in Ohio, county seat of Knox county. It is noted for its superior manufactures, including flour, wagons, machinery, engines, furniture, and tobacco products. Among the general facilities are fine schools and numerous churches. Its institutions include Mount Vernon Academy and Kenyon College, both of which are near the city. Electric lights, telephones, pavements, and waterworks are among the improvements. Population, 1900, 6,633.

MOUNT VERNON, a city of New York, in Westchester county, fifteen miles north of New York City. It is connected by railway and electric car lines, has good schools, and is the residence of many New York business men. The surrounding country is fertile, producing cereals, fruits, and live-stock. There are manufactures of pens, jewelry, glue, and machinery. It has a considerable trade in merchandise. Population, 1900, 20,346.

MOUSE, the popular name of the smaller species of the genus mus, the larger ones being known as rats. Mice are found in all parts of the globe inhabited by man. In many tropical countries they are so abundant as to be extremely destructive in some seasons to the cereal crops, especially in various portions of Australia. The common mouse has a dusty-gray color above, ashy beneath, and the tail is about as long as the body. In autumn it delights to find shelter in houses and barns. The smallest quadruped known is the harvest mouse, which builds a small nest of grass about itself and hibernates during the winter. There are fully a hundred species of mice, among them

COMMON MOUSE

the rice mouse of the southern states; the deer mouse; the cotton mouse, found in cotton-producing countries; the wood mouse; the field mouse; the harvest mouse, and the water mouse. The names applied to these varieties indicate somewhat their habits and the places they frequent. The so-called dormouse (q. v.) does not belong to the true mouse family.

MOZAMBIQUE (mō-zam-bēk'), or **Portuguese East Africa**. See **East Africa, Portuguese.**

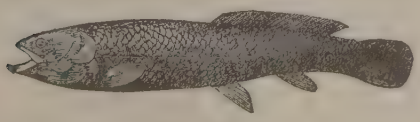
MOZAMBIQUE CHANNEL, an extensive strait between the continent of Africa and Madagascar. It has a width of 425 miles, a length of 1,030, and is noted for its important black whale fisheries. The Comoro Islands lie at the northern extremity of the channel. On its western shore is Mozambique, one of the chief trade centers of Portuguese East Africa.

MOZART (mo-zart'), **Johann Chrysostomus Wolfgang Gottlieb**, noted musical composer, born in Salzburg, Germany, Jan. 27, 1756; died Dec. 4, 1791. His father was a director of the archi-episcopal chapel in his native town, and gave the utmost care to his development of musical talent. In 1762 he and his sister were taken to Munich and Vienna for skillful training, where they received encouragement from the director of Bavaria and Emperor Francis I. The young musician began to compose symphonies at a very early age, and when only fifteen years old he was admitted as a member to the Philharmonic Society at Bolo-

JOHANN MOZART.

gna, Italy, though the rule barred all under twenty from admission. While attending the Sistine Chapel splendid Easter music was given, which Mozart reproduced from memory after hearing it but once, and at the age of sixteen he ranked with the finest musicians in the world. The court at Vienna selected him as imperial composer in 1779, where he located immediately after, and at that city most of the noted musical productions upon which his fame rests were composed. In 1780 he wrote his great composition entitled "Idomeneo," in the same year married Constance Weber, and from this time on was reputed the greatest musician that the world had known. His reputation extended not only to the German-speaking nations and regions, but spread rapidly through France, Italy, England, and other European countries, all giving him enthusiastic reception in his tours devoted to concerts and musical teaching, while the sale of his published works brought him a large profit. He was also granted a handsome annual salary by the king of Prussia, and distinguished honors were conferred upon him in many of the leading countries. His death occurred shortly after finishing a requiem mass on which he had worked about a month. It is said of Mozart that no composer ever combined in equal proportions the perfection of learning and genius, and no one ever wrote with greater ease, finer dignity, and more profound scholarship. He excelled in every department of composing, and, when one contemplates the briefness of his life, it is indeed wonderful to note the large number and variety of his masterful productions. His entire list of different compositions numbers 624. Among them are thirteen symphonies, two cantatas, twenty-four pianoforte sonatas, four operas, and numerous hymns and offertories. His principal works embrace "Missere;" "Mithridates;" "Clemency of Titus;" "Marriage of Figaro;" "Magic Flute;" "Seduction of the Serail;" "Don Giovanni," and "Requiem." Several fine monuments have been erected to his honor, among them one of much beauty at Vienna. His musical works are among the finest and most popular ever produced.

MUD FISH, the common name of several



MUD FISH.

species of fishes. They are found in freshwater bodies, in the lakes and rivers between the Rocky Mountains and the Alleghanies, and also in several sections of South America, Africa, and Australia. The American species belong properly to the ganoids. They attain a length of four feet, and are favorites for food among the Indians. The mud-fishes proper appear to form a connection between fishes and amphibians in that they are able to live for a brief period on land, breathing while out of water by taking in air, which is acted on by the swim-bladder as a lung. While in water they breathe with the gills found in ordinary fishes. The ganoid, or mud-fish of North America, frequently comes to the surface and breathes the air in a similar manner, though it more frequently remains under water for long periods of time. Mud-fishes generally live on insect and animal food, though they also partake of various plants especially the newer growths. Several species attain to a length of from three to six feet, have flat scales, and during a season of drought locate themselves in the mud, where they exist in a more or less torpid state for a considerable period.

MUHLENBERG (mū'len-bĕrg), **Heinrich Melchoir**, German-American clergyman, born in Eimbeck, Germany, Sept. 6, 1711; died in Trappe, Penn., Oct. 7, 1787. He was educated at Göttingen and Halle, became a minister in 1739, and in 1741 came to Pennsylvania as a missionary. From 1742 to 1776 he devoted his entire time to the work of organizing the German Lutheran Church in the colonies, and thereby acquired the distinction of being the founder of that faith in America. He was not only a devoted Christian, but also an ardent patriot, and by his widespread influence did much to aid in the Revolutionary War. His son, John Peter Gabriel Muhlenberg, an American soldier, was born Oct. 1, 1746, at Trappe, Penn.; died Oct. 1, 1807. He was a pastor of the Lutheran church in Woodstock, Virginia. General Washington appointed him a colonel in the army, and he preached his farewell sermon while he wore the uniform of that rank for the first time. Many of the members of his congregation joined his regiment. He rendered valuable services in the battles of Germantown and Brandywine, and by the close of the Revolution was made major-general. In 1789-95 he served in congress, and was again elected in 1799. Frederick Augustus Muhlenberg, also a son of the former, was born in Trappe, Penn., Jan. 1, 1750; died June 4, 1801. He became a minister of the Lutheran Church, developing considerable ability as a pulpit orator. In 1779 he was elected to congress, and was reëlected in 1789. His ability as a statesman caused him to be elected as speaker of the house of the first and third congresses under the constitution.

MUHLENBERG, William Augustus, clergyman and author, born in Philadelphia, Penn., Sept. 16, 1796; died in New York City April 8, 1877. He was a great-grandson of Heinrich Melchoir Muhlenberg, graduated from the University of Pennsylvania in 1814, and in 1817 was ordained minister of the Protestant Episcopal Church. Soon after he became director of important parishes in

Philadelphia, and in 1846 was selected to preach at the Church of the Holy Communion of New York. While serving at the latter, in 1852, he organized the first Protestant Episcopal Sisterhood, and also founded St. Luke's Hospital. Among his writings are "Church Poetry;" "Family Prayers;" "I Would not Live Alway;" "Music of the Church," and "Like Noah's Weary Dove."

MULATTO (mŭ-lăt'tō). See **Negro.**

MULBERRY (mŭl'bĕr-rў), a genus of trees native to tropical and temperate climates, and extensively cultivated on account

COMMON MULBERRY.

of their fruit. The common or black mulberry is the only species that possesses fruit of considerable value, and is a native of Central Asia, whence it was brought to Europe more than ten centuries ago. The tree has many branches. It is low, the leaves are heart-shaped and very rough, and the bark is thick and uneven. This species thrives in America in regions south of 43° north latitude. Its fruit is eaten and also used in the manufacture of wine and preserves. The berries are of a purple-black color, yield a dark red juice, and are quite sweet to the taste. This class of mulberry trees grows vigorously for many years in suitable climates, many specimens in Europe being over 350 years old and still yield an abundance of fruit. The leaves are regarded the most wholesome food for silkworms, on account of which the tree is cultivated extensively in various portions of Asia, southern Europe, and in the United States. Its bark yields a product useful in the manufacture of paper. The principal species of the mulberry in North America is the so-called red mulberry, which thrives abundantly in the central portion of the Mississippi valley, especially in southern Illinois, southern Iowa, Missouri, Kentucky, and adjacent states. Mulberry trees of this class grow to a height of from forty to sixty feet. They yield a durable wood, while the fruit is fairly pleasant but generally quite seedy. A distinct genus of trees bearing this name is the paper-mulberry, which is a native of Japan and the East Indies. It attains a height of from five to fifteen feet, and is serviceable in the manufacture of clothing and paper. Its wood is useful in cabinet and ornamental work.

MULE, a name sometimes used loosely in lieu of the word hybrid, but it is applied more specially to the mule proper, the produce of a male ass with a mare, and to the hinny, the offspring of a she-ass and a stallion. The mule matures at a later period than the horse. It is of service for a longer period, and as a beast of burden has some points of advantage not possessed by the horse. Among the advantages are that its skin is less sensitive; it is more easily fed, is less liable to disease, and is almost as sure-footed as the goat. When treated kindly, it is gentle, and even in warfare is thought to possess advantages over the horse in some respects. The head of a mule is thin and long, ears prominent, tail bushy, mane short, and hoof quite small. It is a favorite animal in many of the southern states, and is employed extensively in the Spanish-American states, southern Europe, western Asia, and many parts of Africa. In size it usually represents the average between the sire and dam, weighing from 700 to 1,200 pounds.

MULHAUSEN (mül-how'sẹn), a city of Germany, situated in Alsace-Lorraine, about twenty miles northwest of Basel. It is surrounded by a fertile region, is well connected by several important railroads, and has an active commercial trade. The manufactures embrace woolen and silk goods, clothing, carpets, leather, machinery, calico, chemicals, hardware, and musical instruments. It has an excellent system of street railways, electric lighting, pavements, fine schools, and several hospitals and institutions of higher learning. Mülhausen dates from the early part of the 8th century. It became a free imperial city in 1273, and during the Reformation formed an important center of Protestant influence. In 1798 it became a part of France, but after the War of 1870-71 it was annexed to the German Empire. Population, 84,270.

MULLEIN (mŭl'lĭn), a tall weed of the figwort family, having stout stems covered with a dense woolly growth, and bearing club-shaped spikes of yellow flowers. Many species have been described, some of which yield medical properties of service in the treatment of coughs and colds. The most common species were brought to America from Europe, and in some sections of the United States they form an obnoxious weed. In early times the Greeks used the leaves in making wicks for lamps, while the Romans made torches by saturating the stalks with suet. It is at present most common in the older sections of the United States, but has

spread quite generally in the populated regions of the central and western states.

MULLER, Max. See **Max-Muller.**

MULLET (mŭl'lĕt), the popular name of a class of fishes. They include many well known species, and generally are divided into two groups: the gray mullets and the red mullets. The different species, about seventy-five, are found abundantly along the coasts and in bays and seas. The species belonging to the red mullets are ground-feeders, but are sometimes classed as surmullets. In the winter time they retire into deep water, but in summer approach the coast, and are most commonly observed in blackish water. They are brilliantly colored, attain a weight of ten or twelve pounds, and are considered good as food fish. The group of gray mullets is distributed quite generally in the Mediterranean, on the seacoasts of Eurasia, and in the warmer seas of America. The upper part is greenish in color, while the sides are more or less silvery. Several species of this group are cultivated extensively in countries adjacent to the Mediterranean, where they attain a weight of from ten to fifteen pounds and are considered favorites for food. The striped mullet is the best known species of America, occurring largely on the Atlantic coast south of New York, and being especially abundant in the vicinity of the Bahama Islands. Large quantities are placed on the market early in autumn, at which season the mullet is esteemed especially for the table. Several species of surmullets present a peculiar appearance when the scales are rubbed off, as underneath them is a beautiful variety of bright red and purple tints.

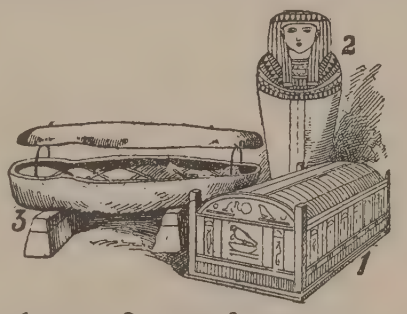
MULOCK, Dinah Maria. See **Craik.**

MULREADY (mŭl'red-ĭ), **William,** noted painter, born in Ennis, Ireland, April 1, 1786; died July 7, 1863. His parents took him to London in 1801, where he became a student at the Royal Academy. His first study was along the line of classic arts, but later he devoted himself to productions from nature, a line of work in which he developed his greatest ability and highest reputation. Among his paintings that illustrate scenes from common life are "Idle Boys;" "Barber's Shop;" "Roadside Inn," and "Horses Bathing." Several excellent portraits were also executed by him, and he attained more than ordinary popularity by the production of illustrations for various books intended for juveniles, and particularly for the celebrated work entitled "Vicar of Wakefield." In 1815 he became an associate of the Royal Academy, and in the following year was made an academician.

MUMMY (mŭm'mỹ), the embalmed body of a human being, but the term is applied also to similarly preserved bodies of such sacred animals of various peoples as the ibis, cat, crocodile, and ichneumon. Extensive researches have led to the belief that mummies were prepared by the ancients because they thought that the soul of the dead, who departed from this life in a justified state, in due course of time would become reunited with the body and enjoy an everlasting and visible existence. The time between death on earth and the period for taking on everlasting life was thought to cover a space of from 3,000 to 10,000 years, and in this period the intelligence existed as a luminous wanderer through space, while a probationary pilgrimage was performed by the soul in the mysterious under-world.

Some writers think that the preparation of mummies was influenced at least partially by a desire to guard against disease. The legendary story relating that the body of the god Osiris had been destroyed by Typhun, but that it was later discovered by Isis and embalmed under the direction of Anubis, is popularly thought the basis that caused mummification to be established as a religious rite. Many different classes of mummies have been found in Egypt, the larger number consisting of human bodies, but there were included many specimens of sacred animals. It is thought that the practice dates from about 4,000 B. C., many of the specimens found indicating that early date as the probable time of the beginning of the art.

It is certain that the children of Israel



1. COFFIN; 2. MUMMY; 3. INNER CASE.

learned the art of embalming in Egypt, since it is related that the bodies of Jacob and Joseph were treated in that manner and carried from Egypt. The art of mummification was also highly developed among the Assyrians, Persians, Hebrews, Romans, and Peruvians, though these peoples were not able to prepare mummies that as successfully overcame the influences of time as those of the Egyptians. Many fine specimens of embalming at a remote period have been discovered in Peru and Mexico, and also in the Canary Islands, where the Guanches developed a skill almost as remarkable as that of the Egyptians. It is thought that the practice ceased in Egypt about the year 700 A. D., and that fully 750,000,000 different bodies were embalmed while the practice prevailed in that country. Fine specimens have been found at various times, the most important of recent date being thirty embalmed bodies of distinguished personages, including the body of Rameses II., which was brought to

light in 1881 at Deir-el-Bahari. The dryness of the air in some countries has a favorable influence upon mummification. In many localities the bodies of men and animals have been found that were mummified as a natural consequence of climatic conditions.

Various methods have been employed by different peoples in the preparation of mummies. The method usually depended upon the state of civilization and the ability of surviving friends to defray the expense incurred. Among the poorer classes the bodies were dried by salt or natron, or left entirely covered with salt for seventy days, after which they were enclosed by wrappings of coarse cloth and placed in the catacombs. The most complicated operations were employed in embalming the bodies of the rich and distinguished. In the common method it was required that the entrails be removed through an opening in the side, though the heart and kidneys were left within the body, and the brains were taken out through the nostrils. The body was next carefully shaved, washed, and soon after brought in contact with the necessary salts and spices, the process depending largely upon the ability to pay the expense. Powerful drugs were used in effecting passage into the various cavities of the skull and different portions of the body, while in some cases the nails were gilded and the toes and fingers encased in costly enclosures of gold.

After all necessary rites and chemical treatments were completed, the bodies were carefully wrapped with bandages of linen. These bandages were extremely coarse for the poorer classes, while the finest India muslin was used for the wealthy. The strips were from two to four inches wide, and from 700 to 1,250 yards long. Each toe and finger was carefully wrapped, next the limbs were similarly enclosed, and finally a firm wrapping was made around the entire body, in many cases from fifteen to twenty thicknesses being utilized. The face was the object of especial care and was treated with a coat of fine plaster and various costly chemicals. It is thought that embalmers of cities often had from 500 to 800 corpses in their mortuaries, since it required considerable time to complete the entire process. The cost of high-class embalming was from $500 to $4,500 per corpse, this depending entirely upon the value of the chemicals, perfume, and ornaments used. Usually the rich were provided with mummy cases, the more expensive consisting of three parts, the sarcophagus or coffin, the outer mummy case, and an inner case to contain the mummy. The outer mummy case of the wealthy was prepared in a manner to show an outline of the person embalmed, and was richly decorated and painted with durable coloring with the view of constituting a fine representation of the individual. Embalming is now practiced by passing preservatives, such as corrosive sublimate, chloride of zinc, arsenic, and various oils, into the body.

MUMPS, a specific inflammation and swelling of the parotid and salivary glands. It is a contagious disease, sometimes epidemic, but generally is communicated by the saliva. The disease occurs mostly in cold and damp weather of spring and autumn. It is most common among children, and is more frequent in boys than girls. With good care it is unaccompanied by danger and seldom affects the same person twice, but when a relapse is taken the swelling and pain are communicated in females to the mammæ, and in males to the testes. Careful attention and remaining indoors soon cause the inflammation to cease, but, if care is not taken, life may be endangered by transferring the inflammation to the brain.

MUNCHHAUSEN (münk'how-zen), **Karl Friedrica Hieronymus, Baron von**, eminent army officer, born in Hanover, Germany, May 11, 1720; died Feb. 22, 1797. He descended from an ancient and noble family, became a cavalry officer in the Russian army, and distinguished himself against the Turks in 1737-39. While engaged in these contests he displayed a passionate fondness for fine horses and hounds, and at various times made successful and adventurous tours to the different regions where wild game was abundant. During that time he displayed a remarkable imagination, which was so inventive that many extravagant stories were originated. These stories were compiled by Rudolf Erich Raspe, a literary genius who accompanied the baron. They were published in 1775 under the title, "Baron Münchhausen's Narrative of his Marvelous Travels and Campaigns in Russia." Later larger editions of the same work appeared, in which were published many additional anecdotes and wonderfully interesting accounts of adventures. Translations of these works were made into various languages. They still enjoy a growing popularity. It is alleged that Münchhausen's imagination in the latter part of his life was more responsive than his memory, and that he was led to believe many of the impossible and improbable productions of his mind. His name has become proverbial in many countries.

MUNCIE, a city in Indiana, county seat of Delaware county, fifty-five miles east of Indianapolis. It has excellent railroad connections, electric lights and street railways, pavements, waterworks, and numerous churches. The public school system is organized thoroughly under well articulated courses of study. Its public buildings include a fine courthouse and a city hall. Among its manufactures are flour, glass, farming implements, machinery, cigars, and earthenware. In the surrounding country are productive deposits of natural gas and oil. There is an important commercial trade in grain, stock, and various articles of manufacture. Population, 1900, 20,942.

MUNKACSY (mŏŏn-käch′ē), **Mihaly**, noted painter whose German name was Michael Lieb, born in Munkacs, Hungary, Oct. 10, 1846; died May 1, 1900. He studied at Vienna and Düsseldorf, and in the latter city produced various splendid works of art. In 1872 he located in Paris, where he devoted himself largely to the production of genre pictures, among them a number illustrating Hungarian life. He also produced many paintings depicting the life of Paris society, and several works devoted to historical subjects. The most noted of his excellent productions embrace "Last Day of a Man Condemned to Death;" "Christ Before Pilate;" "Village Hero in Hungary;" "Christ on Calvary;" "Interior of a Studio;" "Mozart's Last Moments," and "Night Prowlers."

MUNICH (mū′nĭk), an important city of Germany, capital of the kingdom of Bavaria, situated on the Isar River. It occupies a position on an extensive plateau, about 1,690 feet above sea-level, is connected by a number of important railroads, and is one of the most progressive commercial and manufacturing centers of the German Empire. Among its improvements are fine street railways, splendid monuments, public promenades, botanic gardens, and a thoroughly organized system of public schools. The municipal facilities are entirely modern, the streets wide and clean, but in the old part are a number of quaint buildings of irregular character. King Ludwig I. devoted much studious care to the general improvement of the city, adorning it with a splendid royal palace, and encouraging vast social and material improvement. Its noted buildings include the national museum of Bavaria, the royal and national library, the national theater, a number of splendid cathedrals, the Old and New Pinakothek, several institutions filled with rare paintings, drawings, and antique vases, and many splendid churches. It has a large number of monuments representing various German statesmen, military heroes, reformers, and historic events. The public school system is on a liberal and efficient basis, and besides it there are several colleges, academies, hospitals, seminaries, and its celebrated university. This university was incorporated in 1826. It has a fine system of courses, 180 professors and teachers, 4,500 students, and a library of 225,000 volumes.

The museum of Munich is one of the most valuable in the world. It contains not only various productions of noted masters, but also many of historic interest and great value. The manufactures embrace scientific instruments, jewelry, gold and silver lace, musical instruments, carriages, glass, spirituous liquors, cottons, woolen and silk goods, machinery, engines, and hardware. Its export and domestic commercial trade is of growing importance. The city was named from the monks that owned its site. Its history extends back to 962, when it was founded by Henry, duke of Saxony. In 1157 Henry the Lion made it the seat of a mint and salt exchange, and in the 13th century it was strongly fortified. Gustavus Adolphus conquered it in 1632. In 1800 Munich was subdued by the French under Moreau, and in 1805 it was taken by Napoleon. The population consists largely of Catholics, but there is also a fair per cent. of Protestants and Jews. The importance of Munich dates from the early part of the last century, when most of its larger manufacturing establishments were founded, and later its trade developed by the building of railroad connections. Population, 408,430.

MUNSTER (mün′stẹr), a city of Germany, capital of the province of Westphalia, situated seventy-six miles northeast of Cologne. It is connected by the Münster Canal and a number of railroads, has well improved streets, electric lights and street railways, and is noted for its fine churches and educational institutions. It has several botanical gardens, beautiful parks, a number of fine churches, and a splendid cathedral founded in the 13th century. Münster is the seat of a fine university with a natural history museum, a rare art collection, and a library of 75,000 volumes. It also has a number of seminaries, academies, and a normal school. In 1535-36 it was the scene of disturbances by the Anabaptists. It was besieged a number of times in the Seven Years' War, its government was secularized in 1803, and soon after it passed into possession of France, but since the fall of Napoleon it has been a part of the German Empire. There are at present important manufactures of woolen and silk goods, leather, sugar, thread, carriages, spirituous liquors, starch, and machinery. It also has a number of important packing-houses and a large trade. Population, 50,238.

MURAT (mü-rä′), **Joachim**, king of Naples, born near Cahors, France, March 25, 1771; executed at Pizzo, Italy, Oct. 13, 1815. He was the youngest son of an innkeeper, secured elementary training for the priesthood, but at the beginning of the Revolution entered the army of France. In 1791 he became attached to Napoleon, served with that commander in Italy and Egypt, and in 1799 attained to the rank of general. He married Caroline, youngest sister of Napoleon, in 1800, and soon after received command of the consular guard. At the battle of Marengo he distinguished himself as chief commander of cavalry, was made governor of the Cisalpine Republic in 1801, and in 1804 became marshal of the empire and prince of the imperial house. He had command of the cavalry in the Prussian war of 1806, also in the Russian war of 1807, and in 1808 became king of the two Sicilies with the title of Joachim Napoleon. His government was efficient and popular. In 1812 he joined the forces of Napoleon in the Russian campaign, and also aided that warrior

the following year, but after the battle of Leipsic concluded a peace treaty with Austria. When Napoleon began his return from Elba, Murat became engaged in a war against Austria, and on May 2, 1815, he was defeated at Tolentino by Generals Bianchi and Neipperg. Murat effected a safe retreat with a few cavalrymen to Naples, but was required by an insurrection to seek safety in France. He escaped to Corsica at the overthrow of Napoleon, and from there attempted to recover his kingdom of Naples by an invasion, but was captured on Oct. 8, 1815, while landing at Pizzo. Shortly after he was tried by court-martial and soon after shot. Murat had two sons, Achille Napoleon and Lucien Charles Napoleon. The former married a niece of Washington and resided for some time in Florida, while the latter served as a senator in France and under Napoleon III. became an ambassador.

MURCHISON (mûr-kĭ-sọn), **Sir Roderick Impey**, geologist and geographer, born in Parradale, Scotland, Feb. 19, 1792; died Oct. 22, 1871. He studied at the Durham Grammar School and the Marlow Military College, and at an early age entered the military service. An official position was given him in a regiment that served in Spain and Portugal, but in 1816 he left the army to make an extended tour to various portions of the world for the purpose of investigating the geology of different regions. His geological researches extended to different parts of Norway, Sweden, Russia, Germany, and America, and in 1840 he was appointed by the imperial government of Russia to begin a geological survey of the empire, a work that he completed after five years. In 1844 he gave an address in which he pointed out the similarity between the geological structure of the Ural Mountains and the mountains of Australia, and was the first to predict that rich deposits of gold would be found in the regions of the latter. The efforts put forth by him induced many individuals and companies to engage in explorations and expeditions of discovery, not only in Australia, but also in Africa and regions of the Arctic. Many societies of high repute honored him with membership and official positions. In 1846 he was knighted. He was made a baronet in 1863, and in 1865 was elected director of the museum of practical geology. Among his principal writings are "Geology of Russia in Europe and the Ural Mountains;" "Tertiary Deposits of Lower Styria," and "Silurian System."

MURCIA (mûr'shĭ-ạ), a city of Spain, capital of a province of the same name, situated on the Segura River. It is surrounded by a rich and productive region, is well watered, and contains direct railroad connection with the Mediterranean Sea. The streets are clean but narrow, the houses gaudily painted, and there are a number of modern facilities. Splendid gardens of orange, fig, mulberry, and palm trees surround the city. Its principal buildings are the bishop's palace and the cathedral, the latter being a fine representative of Corinthian and Composite architecture, and was founded in 1353. It has manufactures of linens, silk and woolen goods, carpets, oil, leather, cordage, baskets, ironware, glass, gunpowder, machinery, and musical instruments. Murcia was formerly the capital of the ancient kingdom of Murcia. For many years it was in the possession of the Moors, and in 1263 was conquered by Alfonso X. The city has an important trade in merchandise. Population, 100,190.

MURDOCK (mûr'dọk), **James Edward**, actor, born in Philadelphia, Penn., Jan. 25, 1811; died there May 19, 1893. After attending school and securing training as an actor, he appeared successfully at Philadelphia, and in 1838 played with Ellen Tree at New York and other cities. In 1842 he engaged as a Shakespearean lecturer and teacher of elocution, but later played successfully in "Hamlet" and other Shakespearean plays at many of the principal cities of the United States, Canada, and England. In the Civil War he rendered efficient services by appropriating funds raised by personal efforts to the sanitary commission, and also personally appeared upon the battlefields to administer to the wants of the wounded and sick. He joined William Russell in publishing "Culture of the Voice."

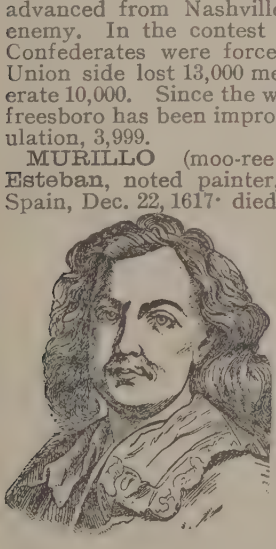
MURDOCK, William, inventor, born near Auchinleck, Scotland, Aug. 25, 1754; died in 1839. He was the son of a millwright, who taught him the arts of a miller, and until 1777 worked in the mill of his father. At that time he engaged at Birmingham, England, in an engineering establishment, and soon after received an appointment to superintend the erection and fitting of structures at the Cornish mines. He built a high-pressure engine to run on wheels in 1784, a structure from which the modern steam locomotive was patterned in at least some respects, and later invented an oscillating engine. Among his later inventions is a steam gun, an apparatus to heat large buildings by hot water, and various machinery for the purpose of utilizing gas for producing light. The last named invention was his most important achievement, which included devices by whose means the distillation of coal gas became possible. Gas was not only successfully produced by these means, but he applied it in lighting large buildings and propelling useful machinery. It is a strange fact that Murdock never gained much profit from his great invention, a circumstance due largely to his neglect in having it patented.

MURFREE, Mary Noailles, novelist, best known by the pseudonym Charles Egbert Craddock, born in Grantlands, Tenn., in 1850. Her father's fortune was destroyed almost entirely by the Civil War, and he soon after went with his family to St. Louis, Missouri. There he wrote for several

reviews and magazines, while the daughter engaged in writing stories of Tennessee mountain-life. Her first story was "The Dancin' Party," and this with several others appeared in the "Atlantic Monthly." "Where the Battle Was Fought" is a splendid story production of the birthplace of the author, being founded on the fact that the house in which she was born was destroyed by shot and shell in the battle of Stone River. Miss Murfree produced many excellent writings, all of which show that she wrote with zealous industry and combined with it splendid natural gifts. Her pseudonym is from the hero of the "Dancin' Party," Egbert Craddock, to which she prefixed Charles. Her productions, aside from those named above, include "In the Stranger People's Country;" "In the Mountains of Tennessee;" "His Vanished Star;" "Prophet of the Great Smoky Mountains;" "Down the Ravine," and "Mystery of Witchface Mountain."

MURFREESBORO (mûr'frēs-bŭr-rō), county seat of Rutherford county, Tennessee, thirty miles southeast of Nashville. It was the capital of the state from 1819 to 1826, has good railroad connections, and manufactures flour, tobacco, utensils, and machinery. It was the scene of several engagements in the Civil War, the most important one being known as the battle of Murfreesboro, which occurred Dec. 31, 1862, and Jan. 1 and 2, 1863. The Federals were commanded by General Rosecrans, whose army consisted of 43,000 men, and the Confederates, numbering 62,000 men, were under command of General Bragg. The Confederates were concentrated near Murfreesboro, on the Stone River, while General Rosecrans advanced from Nashville to surprise the enemy. In the contest of three days the Confederates were forced to retire. The Union side lost 13,000 men and the Confederate 10,000. Since the war the city of Murfreesboro has been improved greatly. Population, 3,999.

MURILLO (moo-ree'lyo), **Bartolome Esteban**, noted painter, born in Seville, Spain, Dec. 22, 1617· died April 3, 1682. He received only an elementary education, and was placed by his parents in the care of his relative, Juan del Castillo, to study painting. His first work that brought him returns consisted of paintings of a religious character, which were exported to South America, and when twenty-four years of age he went to Madrid. Velasquez was then painter to the king, and through his influence Murillo was permitted to study the royal collections of Italian and Flemish masters and also to copy in the royal gallery. In 1645 he settled permanently at Seville, where he soon established his reputation as one of the most eminent Spanish masters. In 1648 he married a lady who possessed considerable wealth. Combining the fortune of his wife with his own personal influence, his home became noted as a center of fashion, and in 1660 he established an academy of arts at Seville. Murillo is noted for the efficient manner in which he treated religious subjects, combining splendid idealism with realism, and giving to all parts of his productions excellent coloring. It is held by critics that his ability to paint with accuracy the shades and tints of human flesh has never been equaled. Besides painting a large number of religious and Scriptural works, he produced many beautiful representations of natural scenery, such as street views, paintings of children, and group work. His celebrated "Conception" is one of his best known works. It sold in 1852 for $120,000, and is now in the Louvre at Paris. Other paintings of note are "Flight into Egypt;" "Moses Striking the Rock;" "Return of the Prodigal;" "Miracle of the Loaves and Fishes;" "Abraham Receiving the Three Angels;" "Peter Released from Prison;" "St. Elizabeth of Hungary;" "Peter Weeping," and "Blessed Virgin."



BARTOLOME E. MURILLO.

MURPHYSBORO, a city in Illinois, county seat of Jackson county, fifty miles north of Cairo. The surrounding country is fertile, and has deposits of coal and building stone. Among the manufactures are flour, cigars, earthenware, brick, and clothing. Electric lights, waterworks, several public schools, and a modern courthouse are among the improvements. The city has connections with other trade centers by a number of railroads, giving it considerable trade advantages. Population, 1900, 6,463.

MURRAY (mŭr'rĭ), the principal river of Australia. It rises in the Australian Alps, near the boundary between Victoria and New South Wales, and flows in a general course toward the northwest nearly to the boundary line of South Australia. Thence it has a course toward the west and south until it flows into Encounter Bay, through Lake Alexandria. The total length of the river is 1,125 miles; its basin includes 270,000 square miles, and it is navigable for a distance of about 175 miles, though large steamers are prevented from entering the stream because of sand-bars at its mouth. It overflows its banks periodically, causing a large scope of country to become enriched by the inundations. Its principal tributaries include the Darling and Murrumbidgee, both large rivers. Through the latter it receives the waters from the Lachlan.

MURRAY, James Ormsby, author and educator, born in Camden, South Carolina,

Nov. 27, 1827; died in Princeton, New Jersey, March 27, 1899. In 1850 he graduated from Brown College, taught Greek there for one year, and in 1861 became a Congregational clergyman in Peabody, Mass. Later he held a number of other important charges in New York City, was elected to the chair of English at Princeton in 1874, and in 1886 became dean of the faculty of that institution. Murray was a man of fine natural ability, an efficient lecturer, and exercised a deep influence upon the young who came under his instruction. He published "Life of Francis Wayland;" "Introduction to Cowper's Poetical Works;" "Religion in Literature," and "Lectures on English Literature."

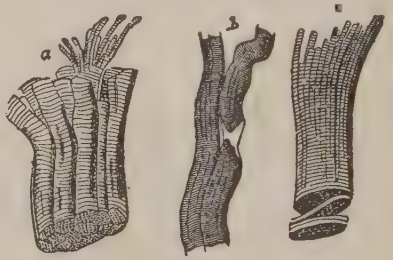
MURRAY, Lindley, grammarian and author, born in Swatara, Penn., April 22, 1745; died Feb. 16, 1826. He descended from Quaker parents, received an education in the public schools of Philadelphia, and in 1766 was admitted to the bar. His eminent ability enabled him to build up a lucrative practice. During the Revolutionary War he engaged in mercantile business, acquiring a considerable fortune. He settled at Holdgate, England, in 1784, where he devoted himself to literary work. He published "Power of Religion on the Mind" in 1787, a work that went through many editions and translations, and in 1795 issued his "Grammar of the English Language." This grammar was a standard in America and Britain for half a century.

MURRUMBIDGEE (mŭr'um-bĭd-jē), a river of Australia, rises in the Blue Mountains, and flows into the Murray. It is situated wholly in New South Wales, has a general westward course, and receives the Lachlan as its principal tributary. The valley of the Murrumbidgee is productive. Its length is about 350 miles.

MUSCAT (mŭs-kăt), or **Maskat,** the capital and principal seaport of the sultanate of Oman, or Muscat, on the Arabian coast of the Indian Ocean. It is situated in a rocky region, having cliffs about 450 feet high in its vicinity. The rocky heights are defended by forts, while the intervening spaces are protected by walls. Its streets are narrow and the summer season gives the city an extremely hot climate, but its situation near the Gulf of Oman and on the route to the Persian Gulf and the Euphrates and Tigris rivers makes it an important commercial point. It has a vast trade in dyestuffs, coffee, pearls, sugar, fabrics, drugs, rice, horses, fish, utensils, and tropical fruits. The city dates from remote antiquity, but its prosperity began with Portuguese occupation in 1508, when it was made a flourishing trade center for the products of northeastern Africa, western Asia, and the East Indies. After Portuguese occupation for 150 years, it passed to the Iman rulers, a class of native princes, who extended their dominion over eastern Africa and large tracts of western Asia. At present it forms a part of Arabia. Its population is about 65,000.

MUSCATINE (mŭs-ka-tēn'), a city in Iowa, county seat of Muscatine county, on the Mississippi River. It is noted as a railroad and trade center. The city has fine schools, several public buildings, electric lights, street railways, a number of libraries, and a public park. There are extensive manufactures of pearl buttons, cigars, carriages, harness, marble and lumber products, ironware, machinery, pickled goods, flour, and earthenware. The surrounding country is fertile, and is noted for its extensive productions of melons, fruits, sweet potatoes, and garden produce. It has an extensive trade in lumber and merchandise. A fine bridge crosses the river at Muscatine. Population, 1900, 14,073.

MUSCLE, an organ composed of contractile fibers, through the contraction of which bodily movement is effected. Muscles constitute the flesh or meaty portion of the body, in which the framework is hidden,



MUSCLES.

a-b, Striped muscles; *c*, More highly magnified.

and, besides producing the varied movements, they give form and symmetry to the body. They vary in size from the large exterior muscles to the delicate ones hidden deeply within the body, many being so small that they cannot be seen with the naked eye. The total number of muscles in the human body is estimated at about 500, most of which are arranged in pairs, each with its antagonist, so that they contract and expand alternately, and thus effect motion by moving the bone to and fro. This is illustrated by grasping the arm tightly just above the elbow-joint, and then bending the forearm upward, when it is noticed that the muscles on the inside, called biceps, become prominent and hard, while the triceps on the outside are relaxed. Muscles on one side of the face draw the mouth in that direction when those on the other side become palsied, while squinting is caused by one of the straight muscles of the eye contracting more strongly than its antagonist.

By close examination of ordinary muscular structure it is easily noticeable that muscles are made up of fibers, the fibrous arrangement being systematic and regular in the direction of the course in which the muscle is to contract or act. A microscopic exami-

nation reveals two classes of muscles—the striped and unstriped. The former are called voluntary, because they are under the control of the will, and by means of them the limbs stiffen or relax as a person chooses. The unstriped are involuntary muscles, and are not under control of the will, such as constitute the blood vessels, intestinal canal, and the heart, though the muscles of the last named organ are classed with the striped. Striped muscular fiber consists of fine long filaments, which break up into smaller fibrillæ. The fibrillæ are made up of fine disc-like bodies, called sarcotic elements, and the fibers are surrounded by a delicate, transparent, sheath-like tissue, called sarcolemma. Unstriped muscular fiber appears as long cells that are pointed at both ends, containing granules and nuclei. The fibers are flat, arranged in the form of bundles, and contract more slowly than the voluntary muscular fiber.

The contractile tissue of the heart differs from the ordinary striped muscular fibers, which make up the great muscles of the body, in that they have long cross-bands instead of fine, and alternate dim and bright cross-bands passing through the whole thickness of the fiber. There is also a difference in that no sarcolemma is present. The common name applied to the muscles of the heart and similar contractile tissues is cardiac. Another distinguishing characteristic in muscular action is that causing the movement of hair-like processes, or cilia, which are found upon certain surfaces of the body. The cilia bend their ends in a given direction and recover slowly, thus causing the fluids resting upon their surfaces to move in definite currents. Ciliary motion probably is due to changes going on in the protoplasm of the cell body. Cilia found in the air-passages assist in the respiratory changes, causing movements in the smaller air-passages of the lungs.

Muscles are usually attached with firmness to two or more points to be acted upon. The point remaining stationary is called the origin, and the point yielding to muscular contraction is designated the point of insertion. Some muscles attached to bones at both ends take their origin from either extremity, while in some cases one extremity ends with attachment to soft parts, and in that case the action is to draw the attached portions toward the bone. In nearly all cases where the two ends are attached to bone surface the muscles furnish power to operate levers of any of the three classes. We have an illustration of the first class of levers in the movement of the head. The back or front of the head is the weight to be lifted, the backbone is the fulcrum on which the lever turns, and the muscles at the back or front of the neck are the powers by which we toss or bow the head. The second class of levers is illustrated when we raise the body on tiptoe. In that case the fulcrum is formed by the toes resting on the ground, the muscle of the calf of the leg acting through the tendon of the heel is the power, and the weight is borne by the ankle joint. The third class of levers is illustrated by lifting the hand from the elbow, when the hand is the weight, the elbow forms the fulcrum, and the power is supplied by the biceps muscle at its attachment to the radius.

In muscles illustrating any one of the three classes it is necessary that there be a joint intervening between the origin and insertion of these muscles, and the ease with which the work is done depends upon the nearness of the power to the weight or

MUSCLES OF THE LEG.

resistance. In the hand there is a marked loss of force from its being applied at a long distance from the weight, but there is a gain of velocity, since the hand moves so far by such a slight contraction of the muscle. On the other hand, in the lower jaw the jaw itself is the weight, the hinge-joint at the back is the fulcrum, and the muscles on each side form the power, and, since the muscular action is much closer to the resistance, there is a great force, but a much smaller speed. The muscles are attached to the bones by strong, flexible, but inelastic tendons, and from the sides of these spring the muscular fibers, thus permitting more to act upon the bone than if they went directly to it.

The tendons are much better fitted for exposure in passing over joints. They are less sensitive to pressure than the more delicate muscles, and also serve to give both

elegance of form and strength to the limbs. This is illustrated nicely in the muscles of the fingers, where the tendons give strength and beauty, and otherwise both inconvenience and bulk would exist. These tendons are attached to the muscles of the arm, extend only to the wrist, and thence fine cords pass to the fingers. Thus it is seen that here and elsewhere both beauty and strength are provided, while ample provisions are made for accuracy and efficiency in movement. The voluntary muscles are made up of small fibers composed of a row of minute cells arranged like a string of beads, and the whole, being constituted of so many threads bound into one bundle, confers great strength. The efficiency of this mechanical principle is exemplified in suspension bridges, where strength to sustain vast weight is secured by small wires twisted into massive ropes, instead of heavy bars of iron. At the joints the bones are enlarged to afford greater surface for the attachment of muscles, and to enable them to work to better advantage.

Muscular contraction in living bodies is usually excited by nervous impulses, and the muscle also exhibits electric currents. These currents are due, not to an external agent, but to the contractile energy inherent in the muscular elements. Heat, acid, pinching, and nervous impulse contract muscular fibers, and, if the stimuli be removed, the fibers resume their previous form and position. Acid is set free during the action. Muscular contraction also produces an elevation of temperature. Muscular energy is exhausted by repeated contraction, and continuous activity tends readily to produce a condition under which the fiber ceases to contract. However, the muscle again responds under a different kind of stimulus, or after the contractile power has been restored by rest. Under the most extensive contraction the muscle is shortened to about three-fifths of its length. The nerves by which contraction is effected are known as motory nerves. They are under the control of the will, and by skillful culture it becomes possible to call into activity muscular action of various kinds at the same time. Muscular movement is influenced quite largely by emotion and passion. There are also muscles that are both voluntary and involuntary, especially those of the eyelid, over which we secure a partial control and also wink constantly without effort.

MUSCOVY. See **Russia.**

MUSES (mūz′ez), a term used in Greek mythology to designate the nine beautiful daughters of Zeus and Mnemosyne. They originally presided over music, song, and dance; but with the progress of civilization the arts and sciences claimed these specially presiding divinities, and in later times they shared in the various functions of poetry and the sciences. Their honor was celebrated alike by mortals and immortals. Apollo was considered their leader in Olympus, and no festivity or banquet was complete without their joy-inspiring presence. No social gathering was held without supplicating their assistance, nor any task undertaken that involved intellectual effort without looking to them for inspiration. It was thought that they endowed with knowledge, wisdom, and understanding; that they bestowed upon the orator the gifts of eloquence, inspired the poet with the noblest thoughts, and the musician with the sweetest harmonies. The nine individuals comprising the muses included Calliope, the muse of epic poetry; Clio, the muse of history; Erato, the muse of poetry or passion; Euterpe, the muse of lyric poetry; Melpomene, the muse of tragedy; Polymnia or Polhymnia, the muse of sublime hymn; Terpsichore, the muse of choral song and dance; Thalia, the muse of comedy and idyllic poetry; and Urania, the muse of astronomy. Pieria in Thrace was the original seat of worship of the muses, where they were supposed to have first seen the light of day and to have produced their sweet, soothing sounds. They loved to haunt the springs and fountains which gushed forth amid the rocky heights of Mounts Hindus, Helicon, and Parnassus, all of which were sacred to them and to poetic inspiration. In statuary they were represented according to their mission, and always held a prominent place in galleries and historic buildings.

MUSHROOM (mŭsh′rōōm), a name commonly applied to numerous rapidly-growing fungi of the higher class, belonging to the

COMMON EARLY MUSHROOMS.

natural order fungi, and consisting usually of a cap-like expansion supported by an erect stalk. The common mushroom has a fleshy head and varies in color from white to brown. It has a smooth or scaly surface, and springs up in rich, moist places. There are hundreds of species, many being widely distributed. The forms are various in the different climatic zones. All the various species are cryptogamic; that is, they have no true flowers containing stamens, pistils, and seeds, but propagate by means of spores. Many of the species are edible, and in some cases their food qualities are quite wholesome. In various localities of Australia, southern South America, and Tierra del Fuego varieties thrive that supply the natives

with the principal portion of their food. The cultivation of mushrooms is an important industry, particularly in Europe, where large fields are grown in beds prepared by mixing horse-dung with earth. Sandy soil is best adapted to their culture, since it adds to their rapid production. The stems of some varieties grow to a height of from eight to twelve inches, and they bear tops correspondingly large, often from three to seven inches in diameter. Those cultivated for table use are largely bell-shaped, have a whitish color, and a pleasant odor and taste.

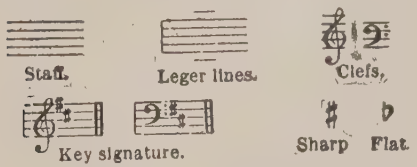
MUSIC (mu'zik), the branch of fine arts which relates to the agreeable combination and succession of sounds, either vocal or instrumental, and embraces melody and harmony. Its history is older than that of civilization, extending back to the remote ages and antedating the deluge. It is mentioned extensively in the history and fables of the Hindus and Chinese, with whom musical art is still quite like it was many centuries before the Christian era. Monuments, legends, and divers relics attest its popularity among various primitive races, who employed rude musical instruments in producing rhythmical divisions of time as accompaniments to games and amusements. Both the Hebrews and Egyptians employed music as a popular feature in divers forms of worship, and from the latter it passed to the Greeks, and thence to the Romans. It is certain that music as an art began to be cultivated by the Romans largely through the instrumentality of the Etruscans, who originated several stringed instruments, and that they early became acquainted with the notes A B C D E F G, which formed the Grecian musical scale. Among them the Grecian instruments, especially the lyre, flute, and martial trumpet, were in common use, and they also borrowed the harp and other stringed instruments from Egypt.

The syllables indicating the notes of the diatonic scale, known as do, re, mi, fa, sol, la, si, do, are of comparatively early Italian origin, but the first recognized Roman school of music may be said to date no earlier than the 16th century, when Claude Gondimel (1510-72) exercised a wide influence. His pupil, Giovanni Piervanni Palastrina (1524-95), did much to popularize music by adapting it to several masses, thereby establishing a sacred type still highly favored. Music in France had its rise with J. B. Lully in the latter part of the 17th century, when it also became a highly cultivated art in Germany and other parts of western Europe. Under the influence of such masters as Handel and Johann S. Bach, Germany rose to the highest place in music by the middle of the 18th century, a position it still retains. Among the eminent musicians of Germany who introduced Italian melody are Mozart, Gluck, and Haydn, while among the masters who gave new poetic elements may be named Beethoven, Mendelssohn, Weber, Wagner, Liszt, Chopin, and Schubert. The German musician Meyerbeer popularized the new school of music in France, and Handel carried its influence to England. Among the new school of musicians are Rubinstein and Brahms in Germany; Bull and Grieg in Scandinavia; Paderewski in Poland; Dvorak in Austria; Sullivan and Stanford in Britain; Gounod in France; Boito in Italy, and Sousa in the United States.

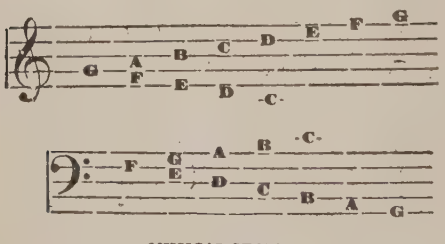
There was a long lapse of time between the production of music of a recognized high scale and its general reception as a branch of study by the public not skilled in musical arts. Gradually the German masters cultivated an interest in music sufficiently extensive to carry musical instruction into the schools of Germany, whence it spread to the schools of other European countries and to America. It is now looked upon as being equal in importance to other branches, particularly since it stimulates the æsthetic feelings, cultivates the voice, enlarges vocal powers, and supplies a valuable aid in discipline and reading. Many of the states have added it to the school curriculum as a branch of study in which instruction is to be given daily. These states make it incumbent upon teachers to pass an examination in that branch before receiving license to teach. Much has been added to the popularity of music by competent instruction in normal schools and teachers' institutes, while the state and national associations of teachers have likewise given to it a guiding and molding influence.

In teaching music in schools the instructor should select the most familiar songs for the first lessons, and thereby gradually improve the tone and precision in singing. Tone perception is best cultivated by practicing oral dictation, and the practice of writing music is an efficient means of directing attention to the notation. However, it should be remembered that the mind rather than the vocal organs needs attention in the cultivation of tone and expression. The songs and exercises selected should embody thought and feeling, since by the agency of these a fuller and more wholesome expression is obtained.

In the study of music we are to bear in mind that sound requires elastic media for its conveyance, as water or atmospheric air. Sound may be generated in the conducting medium, as by a pipe-organ, or may be transmitted to it, as by the vibrations of the strings of a violin or pianoforte. Whether sound has a musical effect depends upon the number of vibrations, its musical character being limited between sixteen and 8,180 vibrations per second. The frequency of the vibrations determines the pitch or relative height of a tone. The more rapid the vibrations the higher the pitch, while the grave or deep tones are produced by the lower number of vibrations. Loudness depends, not upon their number, but upon

the broadness of the vibrations. Musicians take the note called the middle C of the pianoforte as the standard or concert pitch, which is produced by about 515 vibrations per second. The diatonic scale is used to designate the regular tones of a key or scale,

in distinction from chromatic or occasional tones, and on it seven notes, designated by the first seven letters of the alphabet, are represented. A given note is in unison with one produced by twice as many or half as many vibrations per second, and the interval between them is termed an octave. The tone of rest, the tone above which all the other tones in a tune are grouped, is called the key-note or key-tone. Each note of the diatonic scale has a fixed ratio to the key-note as regards pitch, which is determined by the number of vibrations.

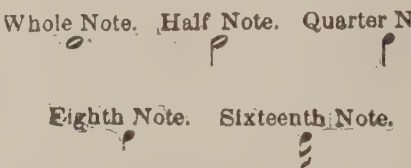
Music is written on a staff made up of five equidistant horizontal lines, but the lines may be extended by leger lines both above and below. To facilitate rapid reading it is customary to employ staves instead of many leger lines, as the bass, mean, and treble staves. The lines and spaces of the staff are called staff degrees. Each staff degree represents a tone of a certain pitch, this being shown by a clef placed at the left end of the staff. The two clefs in general use are the G clef and the F clef, and they indicate the pitch of the line on which they are curled. For instance, the G clef in the illustration is curled on the second line, hence the order below is F, E, etc.; while above we begin with A and proceed upward to G. In a similar manner, the F clef is curled on the fourth line, which designates the order as shown in the figure, both above and below. To determine on what staff degree



MUSICAL STAFF.

the scale begins and ends it is necessary to have signs termed key signatures or key signs, and these are called sharps and flats. When a sharp is placed before a note, it indicates a tone a half-step higher than the letter upon which the note is placed would otherwise represent; while a flat before a note indicates, on the other hand, a half-step lower. There are five kinds of notes in common use, whose names are determined by their shape, as shown in the illustration below.

Most writers divide music into the three departments of melodics, rhythmics, and dynamics. Melodics is that department of music which treats of the pitch of tones. Tone has pitch, length and power. As stated above, pitch is represented on a staff, each line and space of which is called a degree, and is numbered from the lowest upward. Rhythmics is the department of music which treats of the length of tones, while dynamics treats of the power of tones. Melody is the



NAMES OF NOTES.

chief voice-part in giving a harmonic composition, or a peculiar succession of sounds produced in single part by an instrument. Modulation is a change from one key to another. A concordant is composed of two agreeable sounds, and a chord is three or more sounds heard together.

MUSK, a substance obtained from the male musk-deer, and used in the preparation of perfumery and medicine. The musk-deer is quite different from the true deer. It is found principally in the East India Islands, but also in various parts of Asia and western Africa. The musk is secreted by an abdominal gland that is equal in size to a hen's egg. Usually the entire gland is removed and transported to manufacturing centers in its natural state from Bengal and China, but the finest quality is secured from Tonquin. The secretion has a slightly bitter taste, and forms the most penetrating and lasting of perfumes. It was used for embalming at an early date, and still constitutes an important article of commerce.

MUSKEGON (mŭs-kē'gŏn), a city in Michigan, county seat of Muskegon county, on the Muskegon River, about four miles from Lake Michigan. It has an excellent harbor on Muskegon Lake, a body of water formed by the Muskegon River, is extensively connected by important railroad lines, and contains many modern municipal facilities. Among the public improvements are electric lights and street railways, pavements, the Hackley public library of 40,000 volumes, and a number of splendid schools. It is the seat of a fine courthouse and numerous churches. Its manufactures embrace lumber products, machinery, furniture, ironware, musical instruments, and utensils. The surrounding country is fertile. There is an

important trade in merchandise, vegetables, fruits and cereals. Population, 1904, 20,897.

MUSKINGUM (mŭs-kĭn'gŭm), a river of Ohio, formed by the confluence of the Tuscarawas and Licking rivers, in Coshocton county. After a course of 115 miles toward the southeast it joins the Ohio at Marietta. It is connected by a canal with Lake Erie.

MUSK OX, an animal resembling an ox and a sheep, and regarded as a connecting link between those two classes of animals.

MUSK OX.

It is found native in the Arctic regions of America, and individuals are met with as far south as the region corresponding to 60° north latitude. Fossil remains prevailing in various portions of Siberia and northern Europe give evidence that in former times this class of animals was abundant in those regions, but at present no living traces are found there. The hair is long and tufted, brownish in color, and above the shoulders and neck it is sufficiently thick to give the animal an appearance of being humped. Herds of from twenty-five to fifty are frequently found in groups while feeding on reindeer moss, grass, and other vegetable growth. The usual size is that of a small domestic ox, but the females are somewhat smaller. One calf is brought forth by the female in May or June. The musk ox is hunted for its skin and flesh, the latter being quite pleasant to the taste and somewhat scented with the peculiar odor common to the animal. Its wool is about as soft as silk and has been used in making fabrics. The animal may be acclimated in all cold regions. Attempts at domestication have been made, but they have proven successful only to a limited extent.

MUSKRAT, a name commonly applied to several rodents that are characterized by the secretion of a musky substance, or the diffusion of a musky odor. However, several of the classes have otherwise little in common. The common muskrat, also called musquash from its Indian name, is native to the regions extending from Mexico to the Arctic Ocean. It has webbed toes; its tail is flattened laterally, and it occurs in abundance along the banks of rivers and lakes. In many places it constructs dwellings in the water that resemble small haystacks. It also excavates channels in the banks near streams, the openings into these and into their dwellings being always from under the water. Muskrats are able to live in the water for a considerable period, and in the winter spend much of the time in their dwellings, where numerous chambers are provided, but at the approach of danger make hasty retreat into the water by means of an underground channel. In size they are about equal to a small rabbit, but their form is much more bulky, and the color is quite similar to the muddy banks where they dwell. Thousands of these animals are taken annually for their fur, which is of much value in commerce, while the Indians pursue them for their flesh. The muskrat feeds largely on vegetable growth, but particularly on the roots of plants, and on various animal food, such as mollusks. The name is applied also to an insectivorous quadruped of the shrew family, sometimes called desman. It is native in southern Russia and in the vicinity of the Pyrenees. There are several species, the more common having a body about eight inches long, tail of about equal length, small eyes, no external ears, flattened tail, and long hairs. Its fur is valued in the markets of Eurasia, and it is also hunted for the musk secreted by a gland in the groin. Its habitations are along the streams, where it feeds on aquatic larvæ, leeches, and vegetable growth. The name is applied also to an animal of the shrew

COMMON MUSKRATS.

family found in India, which in size and habits resembles the common rat. The tail is long and the color dark brown. It secretes a musk of pleasant and powerful odor.

MUSLIN (mŭz'lĭn), a thin cotton cloth, so named because it was first manufactured at Mosul. It is now manufactured extensively in the United States and European countries. Muslin is sold on the market as bleached or unbleached, and also as a white, printed, or dyed fabric. Among the many varieties are lawn, cambric, mull, leno, figured, muslinet, cord, buke, and Swiss. A

fine grade of figured muslin is known as tamboured, from its imitation of tamboured muslin embroidered by hand, though this class of fabrics is made by a loom.

MUSSEL (mŭs'sl), the common name applied to several species of bivalve mollusks, and to a number of equivalves. The common fresh-water mussels are distributed in many regions, and abound in practically all the rivers, ponds, and lakes of America. These animals are most abundant where the bottom of streams or lakes is made up largely of fine mud, where they may be seen in considerable numbers moving from place to place. Mussels common to the sea occupy regions between low and high water mark. They are fastened most commonly by their bissus, a tuft of silken filament, to the places they frequent, but are able to move safely from place to place. The mussels common to the United States are rarely eaten, but are quite often used for bait by fishers. In many countries of Europe mussels are cultivated extensively for food, particularly in France, Germany, Great Britain, Holland, and Denmark. Mussels grow to maturity in about a year, and are scooped up from the bottom by dredging. From the Firth of Forth and other waters of Great Britain many thousands of tons are taken annually to be used for bait in the deep-sea fisheries. This class of animal life furnishes a wholesome and highly prized human food, but, since mussels grow most abundantly in stagnant water, it is found that they are quite often affected by a dangerous poison brought on by microbes, thus making them productive of fatal diseases. The North American Indians were acquainted with the pearl mussel that yields fine pearls. They used the shells in making various kinds of lighter weapons.

MUSSET (mü-sā'), **Alfred de**, novelist, poet and dramatist, born in Paris, France, Nov. 11, 1810; died May 2, 1857. He descended from a historic family, was the son of a military officer, and secured a liberal education in law, medicine, and art. After devoting some time to efforts in various professions, he decided to engage entirely in literary work. His first poems were written in 1828, and the following year he published them in one volume under the title, "Tales of Spain and Italy." The success of this volume brought him into public notice, and he was not only sought by society, but commended by Victor Hugo. His writings were given to the public of France at a time when a contest was raging in French literature between the two classes known as Romanticists and Classicists. This condition was highly favorable to Musset, since he entered upon a neutral style, thereby giving evidence of the greatest originality shown by modern writers of France, and at the same time utilizing the most excellent qualities of both schools of writers. His tragical comedy, entitled "André del Sarto," appeared in 1833 in connection with his other work of value, entitled "Maramme's Caprices," both of which secured a wide reading. Other works of merit followed in rapid succession, winning for him the patronage of the most distinguished men and the best society of France, and in 1838 he was recognized by being made librarian at the home office. His complete writings have been published in ten volumes, and include some of the most excellent literary gems and dramatic productions of the last century. Among his best works are "Night of October;" "Chandelier;" "Night of May;" "Confession of a Child of the Age;" "Rolla," and "Bettine."

MUSTANG. See Broncho.

MUSTARD (mŭs'tērd), the name commonly applied to many different plants, of which the black and the white mustard are the most common. Both these varieties are annual plants. They attain a height of from three to seven feet, bear lyrate leaves, yellow flowers, and slender pods containing a number of roundish seeds. They are native to southwestern Eurasia, but have been naturalized in the United States and are cultivated extensively for the manufacture of condiments. Mustard is employed to a considerable extent in medicine, in the manufacture of oil of mustard, and for poultice purposes. The wild mustard, an obnoxious weed, is found in many of the cultivated fields. Its tendency to multiply rapidly and entirely possess the field can be overcome only by careful cultivation.

MYCENÆ (mī-sē'nē), an ancient city of Greece, located in the northeastern part of Argolis, in the Peloponnesus. It was founded by Perseus and was the residence of Agamemnon before the Trojan War. At that time it was considered one of the most important Grecian cities. Later the military forces of Argos destroyed much of the city, but it was again rebuilt. The ruins still remaining are of interest on account of their great antiquity, among them the treasury of Atreus and the gate of lions. Many interesting antiquities have been brought to light by a series of excavations, notably those carried on by Henry Schliemann in 1876, when various weapons, tombs, ornaments, and monuments were discovered. It is thought that most of these objects of interest were constructed during the Doric invasion, for the reason that they appear to be allied to the types produced in various portions of Asia Minor and Mesopotamia.

MYRMIDONS (mĕr'mĭ-dŏns), the celebrated troops of Thessaly that accompanied Achilles in the Trojan War. They ranked among the most famous warriors of ancient Greece. Under the leadership of Peleus they came into Thessaly, and later colonized the island of Ægina. The name Myrmidons was applied to them from the legend that they converted the ants into men, the term meaning ants.

MYRRH (mẽr), a gum resin that exudes from a shrub native to Arabia, Abyssinia, and Somali Land in Africa. The myrrh shrub or tree has a whitish-gray bark, is quite low and branchy, and bears a fruit about the size of a pea. Myrrh occurs in the form of roundish and irregular masses, called tears, which vary from small grains to the size of an egg. They are semi-transparent, and have a reddish-brown color and a peculiar and agreeable fragrance. The ancients used myrrh extensively for incense, in embalming, and for perfume. At present it is still employed for perfume and in medicine. It is slightly soluble in water and alcohol, but may be dissolved readily in chloroform. The best quality in the market is known as Turkey myrrh, while inferior grades are secured from Bombay and other Indian points.

MYRTLE (mẽr'tl), a genus of plants native to western Asia, but now naturalized quite extensively in Europe and other

AMERICAN MYRTLE.

regions. The leaves are opposite, flowers axillary or terminal, and mostly white or pink colored. Most species bear black berries with a pleasant, spicy odor. They are used in the preparation of medicine for dysentery, rheumatism, diarrhœa, and internal ulcers. The leaves are employed in the preparation of perfume and for making a gargle. This class of plants has been renowned from ancient times as of service in yielding beautiful foliage; for preparing wreaths and other ornamentations for adorning heroes of war; in the performance of religious rites, and as an emblem of civic authority. The South American myrtle is found largely in Chile and Peru. It supplies foliage and berries equal in value to those of Eurasia. Both species were utilized by natives for medicine and food from an early time. The common running plant known as periwinkle, found extensively in the United States, is frequently called myrtle, though the appellation is improper.

MYSORE (mī-sōr'), a state and city of India. The state is situated in the southern part of India, has an area of 27,950 square miles, and a population of 5,245,765. It is noted for its production of cereals, silk, cotton, coffee, and fruits. The city of Mysore is the seat of its government. It is situated about 250 miles southwest of Madras, with which it is connected by a railroad. The streets are platted at right angles, and there are several temples, public buildings, and the rajah's palace. It has considerable manufactures of silk and cotton goods, jewelry, cutlery, metal ware, and utensils. Population, 60,840.

MYSTERIES (mĭs'tẽr-ĭz), a term applied to dramatic performances given in the Middle Ages. They were represented originally in churches and at solemn festivals, and in a manner quite similar to the miracle plays. These plays treated religious subjects, and were so named because their purport was to exhibit the teaching and effect of the mysterious doctrines of Christianity. They differed from the miracle plays in that in the latter were represented more largely scenes from the lives of the saints. The mysteries offered a very effective way of attracting attention to the Scriptural teachings, especially among the peoples of Europe, who had not yet learned of the purport and plan of the Scriptures as they relate to the salvation of mankind. At the time of the guilds and trades these exhibits were given in series, some of the plays requiring several days. Among the different mystery plays were those of the "Wise and Foolish Virgins;" "Passion of Christ," and "Slaughter of the Innocents." In later times Milton's "Paradise Lost" and several other writings were utilized in the exhibits. See **Miracle Plays**.

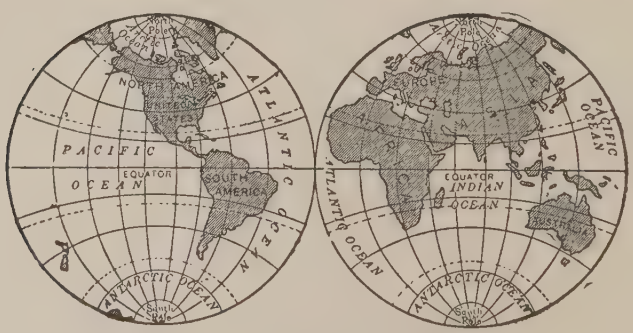
MYTHOLOGY (mĭ-thŏl'ō-jў), the science that investigates the meaning of myths or legends, and traces the relationship between the myths of different peoples and countries. Myths of various kinds have been common among different peoples from remote antiquity, and, though they differ in various respects, there is a marked similarity among many of them. Even the savage races of the present time pass their fables, traditions, and myths from generation to generation. The myths of different peoples have been collected carefully by writers and naturalists, expecially those of the ancient peoples of Hindustan, Egypt, Greece, and Rome. More recently extensive study has been given to the myths of the early races of Europe and America, especially to the folklore of Scandinavia and the Esquimos. However, the myths of civilized peoples, like those of the Greeks, Romans, Egyptians, and the inhab-

itants of western Asia, remain of greatest interest. This circumstance is accounted for because they are related more nearly to the early history of the people at present representing the highest civilization, and for the reason that they enter largely into the works of art, such as paintings, sculptures, and architecture.

Students of mythology were prevented from making material progress in mythological study until within the last few centuries, for the reason that they were confronted by orthodox traditions, and by ignorance of the natural history of man and the ancient languages. It is but comparatively recently that the languages of the Chaldæans and Egyptians have become unsealed, and still more recently that material progress began to be made in the effective study of Sanskrit. The myths of civilized people do not fail in containing both rational and irrational elements, and, as we approach nearer to the more savage and primitive, the irrational is multiplied with rapidity. The rational elements of myths are those which represent the gods as wise, mighty, and beautiful beings, while the irrational present a series of silly and meaningless phenomena. Among the latter are such as represent unnatural and absolutely impossible conditions or changes, among them those of the Grecian and Roman gods.

The Grecian god Zeus was represented by a great statue at Olympia; Homer describes him as a god who beholds all things and turns his shining eyes everywhere. By others he is said to have been buried in Crete; that he assumed the shape of a swan and became the father of Castor and Pollux; and in another instance he is spoken of as being afraid of Attes. Max-Müller was one of the most thorough and successful investigators of ancient mythology. He designates three predominating parts or lines common to all systems of myths; namely, religious, historical, and poetical. While mythology is not religion, history, philosophy, or poetry, it comprehends elements of all these under a form of expression that is natural and intelligible in certain stages of the development of society, but, after thought and speech had sufficiently developed, it became tradition, and in that sense is largely unintelligible and unnatural.

MYTILENE. See **Lesbos.**



WESTERN AND EASTERN HEMISPHERES.

N

N, the eleventh consonant and fourteenth letter of the English alphabet. It is classed as a nasal liquid of the lingual class. The letter n is sounded by placing the tongue near the roots of the upper teeth, and emitting a vocalized sound through the nose. Its ordinary sound occurs when used in such words as tongue, knot, and done, but it has a guttural nasal sound before gutturals, as g or k, when it is almost equivalent to ng, as sing, finger, song, drink, and link. When used after m as a single letter it is silent, as in hymn, condemn, and autumn, but when preceded by p, k, g, or m, it alone is sounded, as in pneumatic, know, gnaw, and mnemonics.

NABONASSAR, Era of, the time at which Babylonian chronology began, and which was later adopted by the Greeks of Alexandria and other peoples. Ptolemy calculated by astronomical phenomena that Nabonassar ascended the throne of Babylon on Feb. 26, 747 B. C., which date became the beginning of the year according to the Era of Nabonassar.

NACHTIGAL (näk'te-gäl), **Gustav**, noted traveler, born in Eichstadt, Germany, Feb. 23, 1834; died April 10, 1885. He secured a liberal education, took a course in medicine, and until 1863 remained in Germany as an army surgeon. At that time he made a tour to North Africa, and in 1868 was commissioned by the king of Prussia to convey presents to the sultan of Bornu. In 1869 he left Tripoli for Bornu, proceeding by way of Fezzan and Tibesti. After exploring various portions of Bornu and Bagirmi, he returned home in 1874, making the return trip by way of Wadai, Dar-Fur, Kordofan, and Cairo. In 1879 he published the results of his travels in Sahara and the Soudan, a work that contains the first information secured by modern travelers of several regions of Africa. The emperor of Germany commissioned him in 1884 to annex several regions on the western coast of Africa, including those known at present as Cameroon, Angra Pequena, and Togoland. His death occurred off Cape Palmas while making the return journey.

NADIR (nā'dēr), a term used in astronomy to designate the point of the celestial sphere directly beneath where one stands, and diametrically opposite the zenith, or the point directly overhead. The two poles of the horizon are formed by the zenith and nadir.

NADIR SHAH (nä'dẹr shäh), eminent ruler of Persia, born near Kelat, Persia, in 1688; assassinated June 20, 1747. He was a member of a powerful Turkish tribe, and entered the service of the governor of Khorassan at the age of twenty-one, but was degraded for an alleged offense. Soon after he organized a band of marauders numbering about 3,000, and with them was successful in securing possession of Kelat and the whole of Khorassan. At that time an Afghan dynasty had control of Persia, and to overthrow its rule Nadir succeeded in securing the enlistment of large numbers of Persians. His designs were supported vigorously because of the traditional hatred of Afghan usurpers in Persia, and it became an easy matter to defeat their chief, Melek Ashraf, and clear the entire country of Afghan influence. Tamasp now became the ruling sovereign of Persia, while Nadir secured the governorship of Seistan, Khorassan, Kerman, and Mazanderan. In 1731 he invaded the Armenian provinces to expel the Turkish usurpers, and, after returning from a successful campaign, removed Tamasp from the throne for incompetence and elevated his infant son, Abbas III., to the same position in 1732, and when that sovereign died, in 1736, Nadir was elevated to the throne as Nadir Shah. Immediately he began to plan for gigantic military operations, conquered Georgia from the Turks, annexed Afghanistan, and reduced large portions of India. From the latter country he brought to Persia the celebrated Kohinoor diamond and other valuable prizes worth $100,000,000. His assassination was due to the tyrannical policy adopted in the latter part of his reign. A son survived him, and was taken to Vienna by way of Constantinople. He was educated as a Catholic, entered the Austrian army under Empress Maria Theresa, and secured a reputation as Baron Semlin.

NAGASAKI (nä-gạ-sä'kĭ), an important seaport city of Japan, located on the west coast of the Kiushiu Island. It was the only Japanese harbor opened to European trade for about two centuries. In 1859 it was one of the five Japanese ports opened to the trade of America and several European countries, and ten years later was included in the seven seaports opened to the trade of the world. The city is beautifully situated, has a splendid harbor, and manufactures chemicals, lacquered wares, silk, fabrics, tobacco products, porcelain, and utensils. It has a large export trade of Japanese products and a correspondingly important import business. Several missionary establishments are located at Nagasaki, among them those supported by the Americans, Dutch, British, French, and Germans. Vast dock facilities have been built in recent years, which rank among the largest

and most important improvements of this character in Japan. It has telephones, pavements, electric lights, and other modern improvements. Population, 59,740.

NAGOYA (nä-gōi'ä), an important city of Japan, situated on the island of Nippon, about 165 miles southwest of Tokio, a short distance north of Owari Bay. It formerly was the capital of the princes of Owari, and is still the chief city of the province of that name. Its seaport is at Yokai-ichi. The city is noted for its manufacture of pottery, porcelain, lacquered work, utensils, and cotton and silk fabrics. It has a number of public buildings, including a fine postoffice, hospital, normal school, public schools, superior court, and several libraries. Nagoya is also the seat of a number of fine churches and temples. It has electric and gas lights, street railways, pavements, and waterworks. Population, 250,500.

NAGPUR (näg-pōōr'), a city of India, capital of the province of Berar. It is the focus of important railroads, giving it trade conveniences with the leading ports of India. The city is situated in the valley of a tributary of the Goodavari River, is surrounded by a fertile country, and occupies a fine site. Its temperature is hot and the climate unhealthful. There are manufactures of cotton textiles, woolen and silk goods, turbans, metal products, machinery, blankets, and utensils. Its interior and foreign trade is extensive. On Nov. 27, 1817, it was the scene of an important battle between a force of 1,350 British commanded by Colonel Scott and a native army of 18,000 men, in which the latter was defeated. Population, 119,350.

NAHUM (nā'hum), the seventh of the twelve minor prophets, author of the vision of Nahum, the Elkoshite, in which prophecies are directed against the city of Nineveh. It is thought that he was born in a village on the east side of the Tigris, called Elkosh, and that he prophesied about 712 B. C. His work is clear in style, original, and full of animation, and he uses the purest classical Hebrew. Tourists are shown a grave thought to be that of the prophet at the modern town of Elkauseh, in Upper Galilee, but some writers think he was buried on the banks of the Tigris.

NAILS, the name of headed pins or spikes of metal, usually having rounded or flattened heads, and commonly made of steel. They serve a useful purpose for driving into woodwork to hold different pieces together, but are also used in saddlery, upholstery, horse-shoeing, shoe-making, slating, and for various other purposes. The manufacture of nails has long been an important industry, and the consumption is enormous in all civilized countries, especially where lumber is used in the construction of houses and other buildings. There are many different classes of nails, the variations being necessary on account of the different purposes for which they are employed. Among the various kinds are spikes, fencing nails, building nails, clouts, roses, clasps, sprigs, brads, tacks, and many others. They are classed usually according to their manufacture into four principal divisions: hand-wrought nails, wire nails, machine-wrought nails, and cast nails.

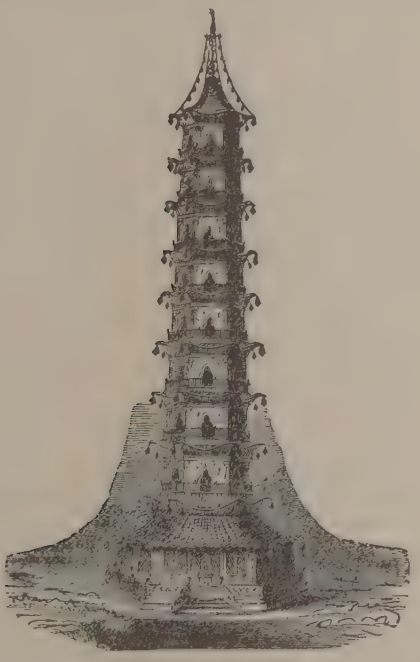
Formerly nails were manufactured by hand labor, each nail being forged from a thin sheet or rod of iron, and male and female laborers were employed in their production. An American inventor completed a device in 1810 by which it became possible to cut one hundred nails per minute from a sheet of iron, the heading being done in the same operation. Subsequently vast improvements were made in the machine, whereby it has become possible to produce as high as 1,000 nails per minute, the number varying somewhat according to the class of nails produced. The usual process includes the heating of strips of metal, then passing them into the machine to be cut, and, after falling to a receptacle below, they are clasped by an ingenious mechanical device to be struck with a force sufficiently powerful to form the head. Wire nails have gone largely into use for ordinary building purposes, but machine-wrought and cast nails are employed in finishing work, such as making casing and attaching ornaments. Hand-wrought nails are used in horse-shoeing and for other purposes in which clinching is necessary.

NAILS, the horny plates or protective coverings on the phalanges, or fingers, and toes of many animals. They are constituted of modified forms of the cuticle. The nails are generally set in a matrix or groove in the cuticle, from which they grow at the root in length and from beneath in thickness. In most animals the matrix is thick. It contains highly vascular papillæ, and as long as it is uninjured the nail is replaced after an accident. The nail structure differs largely in form and size in different animals. Nails form an elastic covering on the dorsal surface of fingers and toes in man. In hoofed animals, like the horse and camel, they constitute a protective covering known as hoofs; in birds and sloths their form is especially adapted to clasping elevated vegetable forms or for scratching; while in many amphibious animals, like the toad, they appear only as an enlargement or thickening of the skin.

NAMAQUALAND (nä-mä'kwä-land), the name applied to a region of southwestern Africa. It consists of two portions, Little Namaqualand and Great Namaqualand. The former is situated south of the Orange River and now forms a part of Cape Colony, while the latter extends from the Orange River to Walfisch Bay, and since 1884 it has been a possession of Germany. The original inhabitants of this region are known as Namaquas, a Hottentot tribe governed by petty chiefs. They subsist largely by follow-

ing a pastoral life. At present there are about 50,000 of these people, most of whom are in the German possessions. Within recent years material progress has been made among them by missionaries and teachers.

NANA SAHIB (nä'nä sä'hib), a celebrated native leader of India, who was born about 1825 and became famous because of leading the Sepoy insurrection of 1857. His education was that of a Hindu nobleman. He was adopted as the son of the Mahrattas sovereign, and was proclaimed by the mutineers as their peshwa. The extension of English rule was opposed strenuously by the Indian natives, on account of which the mutiny occurred in Cawnpore in 1857, and, after besieging the Europeans, they promised to allow them to escape safely to the Ganges on condition of surrender. However, as soon as they capitulated a general massacre of the men, women, and children followed. Sir H. Havelock soon after defeated the Sepoy leader, and he escaped into Nepal. It is thought that he finally found safety in Central Asia, but his real fate remains a mystery.



PORCELAIN TOWER.

NANCY (nŏn-sē'), a city of France, formerly the capital of Lorraine, but since 1872 the capital of the department of Meurthe-et-Moselle, located 175 miles east of Paris. It is nicely situated on the Meurthe River, has good railroad connections, and enjoys an extensive trade. Its principal buildings embrace a bishop's palace, the Hotel-de-Ville, a number of splendid churches, and several government buildings. Stanislas Laszcinski, king of Poland, resided in Nancy from 1735 to 1766, when he held the position of duke of Lorraine, and the city now contains a beautiful statue of him. Among its municipal improvements are gas and electric lighting, a system of public schools, pavements, public parks, street railways, and several libraries. In the city are manufactures of embroidery, cotton and woolen goods, ironware, muslin, spirituous liquors, machinery, earthenware, and artificial flowers. The Germans occupied it in 1870-71. Population, 87,655.

NANKING (năn-kĭng'), or **Nankin**, a city of China, capital of the province of Kiangsu, 550 miles south of Pekin. It is finely located on the Yangtse Kiang, has a wall about forty feet high surrounding it, and is noted as one of the centers of Chinese literature and learning. The city has an important navigation trade and manufactures of satin, porcelain, utensils, fireworks, wearing apparel, and toys. Anciently the city was known as Kin-ling. It formed the seat of the Han dynasty from 206 B. C. to 25 A. D., and in 1368 was made the southern capital of China by the Ming dynasty. In the latter part of the 14th century its importance was lost for the reason that the capital was removed to Pekin, and from 1853 to 1864 it was held by the rebellious Taipings as their seat of government. At that time the porcelain tower, a structure 200 feet in height, built in 1432, was destroyed, and in the same insurrection many of the tombs, palaces, and other public buildings were put in ruins. Formerly the population numbered fully half a million, but at present it is placed at 150,500.

NANSEN (nän'sẹn), **Frithjof**, Arctic explorer, born in Christiania, Norway, Oct. 10, 1861. After attending several creditable institutions of higher learning, he was made curator of the department of zoölogy of the Bergen Museum in 1882, and while serving in that position made several expeditions to collect antiquities. In 1882 he explored the seas of Iceland and Greenland, and in 1888 succeeded in crossing the ice-cap of Greenland from the eastern to the western coast. Soon after he published an account of this expedition in a work entitled "Across Greenland." The discoveries made at that time led him to believe that an open current of water flows constantly across the polar basin from Bering Sea, and that it is possible to enter the path of this current and

FRITHJOF NANSEN.

succeed in reaching within a very short distance of the north pole. Soon after he designed a vessel with rounded sides, that was constructed in such a manner that ice floes would lift instead of crushing it when coming in contact. With twelve companions he started in this vessel, called the Fram, from Mardoe, Norway, on July 21, 1893, with the view of reaching the ice drift. He passed by the New Siberian Islands, crossed the Kara Sea, and was not heard of again until Aug. 13, 1896, when he returned safely to Mardoe.

The account of northern explorations, published by Dr. Nansen, and his lectures inspire one with admiration for the endurance and bravery of the little company. In September, 1893, the vessel became attached to an ice pack, with which it drifted as Nansen had supposed it would, and by March 14, 1895, a point in latitude 83° 59′ was reached. Thence he and a companion named Johnson proceeded with sledges toward the pole, but the lack of a sufficient number of dogs prevented them from reaching their destination, though they succeeded in making their way to 86° 14′, which they estimated at 261 miles from the north pole. During the voyage many great hardships were endured, the company subsisting mostly on bear meat, and for the purpose of protection constructed several huts of stone to guard against the effects of remarkable cold. Nansen relates that electric light was furnished during the long and dreary nights by an arc-lamp, which was supplied with electricity by a windmill, and during calms by the sailors turning a capstan. A phonograph was utilized to entertain the company, the songs being supplied largely by Mrs. Nansen before the expedition started upon the voyage. Dr. Nansen made several tours through America for the purpose of lecturing on the Arctic region, and in these lectures described in an interesting manner the discoveries made on the Franz-Josef Land Archipelago, and an area of about 50,000 square miles previously unknown. His voyage established conclusively the fact that there is no undiscovered continent in the north polar regions.

NANTES (nănts), an important city of France, capital of the department of Loire-Inferieure, 210 miles southwest of Paris. It is located on the Loire River, thirty-eight miles from the ocean, and is important as a navigation and railroad trade city. Nantes is beautifully built, has fine streets, excellent pavements, boulevards, electric lights and street railways, and many interesting buildings. The ducal castle served as a residence of Charles XIII. and several succeeding kings. Its cathedral, founded in 1432, has a monument to the duke and duchess of Brittany. Other interesting buildings include the museum of natural history, the museum of paintings, and the public library containing 60,000 volumes. Its harbor has an accommodation for 250 vessels, and the river has been improved in such a manner that the largest vessels may reach the city. The manufactures embrace cotton textiles, woolen and silk goods, sugar, chemicals, salt, cordage, optical instruments, furniture, spirituous liquors, sail cloth, machinery, and sailing vessels of all kinds. Nantes has an interesting history as a seat of Gaulish influence before Roman occupation. It was for many years a possession of the dukes of Brittany, but when Anne of Brittany married Louis XII., in 1499, it, like her other possessions, became merged into France. The Revolution was particularly disastrous to Nantes, since fully 30,000 people were destroyed in the city and in its vicinity. Population, 124,620.

NANTES, Edict of, a famous decree signed at Nantes by Henry IV. of France, on April 15, 1598. By this decree religious liberty was granted to the Protestants, and they were also allowed to become office-holders under the general government. Louis XIV. signed a decree revoking the edict on Oct. 18, 1685, in consequence of which France lost fully 400,000 of her most industrious and intelligent citizens. Many of the emigrants settled in Germany, Holland, Switzerland, America, and England.

NANTICOKE (năn′tĭ-kōk), a town of Luzerne county, Pennsylvania, on the Susquehanna River, twenty miles southwest of Scranton. It is situated in a productive anthracite coal region. The town has important railroad connections, several fine school and church buildings, and numerous municipal facilities. There are manufactures of machinery, ironware, earthenware, and utensils. It is connected with other trade centers by electric car lines. Population, 1900, 12,116.

NANTUCKET (năn-tŭk′ĕt), county seat of Nantucket county, Massachusetts, on Nantucket Island, twenty-seven miles south of the peninsula of Cape Cod. The island is fifteen miles long, from two to four miles wide, and has an area of forty-five square miles. The town is coëxtensive with the island. It has railroad conveniences, modern municipal facilities, good schools, and several libraries. Nantucket is noted as a health resort. Cod fishing is the principal industry. Population, 1900, 3,006.

NAPHTALI (năph′ta-lī), the son of Jacob and Rachel's maid Bilhah, and who is known as the head of one of the twelve tribes of Israel. The name Naphtali is defined as meaning "my wrestling." The tribe gave efficient support to the united army of Israel at the time Canaan was invaded. It received a tract of land in the upper part of Galilee, and, when Tiglath-Pileser made an incursion from Assyria, it was carried almost totally into Assyrian captivity. Kadesh was the principal city in its territory.

NAPHTHA (năf′thà), an inflammable oil distilled from organic bodies, such as bituminous shale, asphalt, minerals, and coal tar,

but principally from petroleum. It is light, volatile, and colorless. Naphtha is employed for a solvent, as in the manufacture of paints and varnishes, and also as a burning fluid for illumination. The ancient Egyptians prepared naphtha from bitumen and asphalt for use in their lamps, and to this product the name was limited originally. As the science of chemistry became enlarged the term was applied to a number of inflammable, mobile, volatile liquids, and at present it is extended in its application to any liquid hydrocarbon and natural petroleum, or some of its volatile products. Caoutchouc naphtha is obtained by the dry distillation of crude india-rubber; coal-tar naphtha is the volatile mixture distilled from coal tar, containing xylene, benzene, and silver-hydrocarbon; coal naphtha is distilled from rich bituminous coal; petroleum naphtha is the more volatile portion of petroleum, which is collected separately during the distillation and placed on the market as crude naphtha, or again separated by distillation into gasoline, benzene, and refined naphtha; wood naphtha is the well known methyl alcohol; and shale naphtha is distilled from bituminous shales or schists. Petroleum is found in large quantities in Pennsylvania, Ohio, Canada, China, on the Caspian Sea, and many other regions. It yields about twenty per cent. of naphtha, and this is separated into gasoline, benzene, and benzoline. In reducing coal a tar is obtained which yields about fifteen per cent. of naphtha.

NAPHTHALENE (năf'thȧ-lēn), a solid crystalline hydrocarbon obtained from coal tar by distillation, but it also occurs naturally as a mineral. It burns with a highly luminous but smoky flame, melts to a clear liquid at 79°, and crystallizes into leafy crystals. A large number of substitution products may be formed by uniting it with chlorine bromine. A hydrocarbon known as naphthyl and kindred products are obtained by mixing a quantity of naphthalene with sulphuric acid, manganese, dioxide, and water, and heating it to a high temperature. Naphthyl alcohol is derived from naphthyl, and from it fine yellow dyes are secured for coloring wool, silk, and other textiles fine shades of golden yellow, lemon, and orange.

NAPIER, Robert Cornelius, British general, born in Ceylon, Dec. 6, 1810; died in London, England, Jan. 14, 1890. He secured a military education at Addiscombe, engaged as engineer with the Bengal military forces in 1826, and at the siege of Multan was severely wounded. Later he became chief engineer of the Punjab, in which position he rendered efficient services in planning vast improvements. After the siege of Lucknow he was knighted, and the thanks of parliament were extended to him in 1858 for services in the Chinese War. In 1868 he commanded an expedition in Abyssinia, and for efficient services at Magdala was created Baron Napier of Magdala and given an annuity of $10,000. He became commander-in-chief of the Indian military forces in 1870, served as governor of Gibraltar in 1876-82, and later was field-marshal.

NAPIER (nā'pe-er), **Sir Charles James**, soldier, born in Whitehall, London, England, Aug. 10, 1782; died near Portsmouth, Aug. 29, 1853. He descended from a distinguished family, became an ensign in the army in 1794, and three years later was made aide-de-camp to Sir James Duff. He served in the regiment dispatched to suppress the Irish rebellion, and in 1811 volunteered his services in the Peninsular War, serving at Coa and Busaco, and in the latter place was severely wounded. Shortly after he took part as a British officer in the War of 1812 with the United States, and in 1814 served in the war against Napoleon, taking part in the capture of Cambray, but missing the celebrated engagement at Waterloo. Shortly after he entered the military college at Farnham, where he studied the theories of strategic warfare and engineering. In 1822 he entered upon five years' service as governor of Cephalonia, where he aided in promoting Greek independence. He refused the governorship of Australia in 1834, became major-general in 1837, and in 1841 resigned his command and went to India. The following year he received command of the army in Sinde, where he was dispatched to subdue the ameers. On Feb. 17, 1843, he made an attack upon the Baluch army at Mecanee, which he defeated with an army of 2,500 men against a force of Baluchs numbering 22,000 men. Shortly after Sinde was annexed with Napier as its governor, but, because of differences regarding the presidency of Bombay, he resigned in 1847 and returned to England. Soon after he was again placed in command of the British forces in India, where he rendered efficient military services, but in 1850 returned to England after being reprimanded on a trifling point of discipline. He published "Lights and Shadows of Military Life."

NAPIER, Sir William Francis Patrick, soldier and author, brother of Sir Charles, born near Dublin, Ireland, Dec. 17, 1785; died Feb. 12, 1860. In 1800 he became an ensign in the artillery stationed in Ireland, later served in Denmark and the peninsulas campaign, and at Coa and Cazal Nova received dangerous wounds. In 1819 he retired from the army as a lieutenant-general and entered upon a brilliant literary career. Among his publications are "History of the War of the Peninsula;" "Life of Sir Charles Napier;" "Conquest of Sinde," and "Administration of Sinde."

NAPLES (nā'plz), the largest city of Italy, on the Bay of Naples, 158 miles southeast of Rome. It possesses much beauty, is famed as a center of industry and commerce, and has a fine climate and clear atmosphere. The city has well improved streets and all the modern facilities that

appertain to the general convenience, such as electric lights, street railways, telephones, telegraphs, railroads, public parks, and splendid libraries. It has fully 325 churches, many of which possess much beauty in architecture and finish. The cathedral of St. Gennaro is a structure of great beauty. It contains the tombs of Pope Innocent IV. and Charles of Anjou, and many beautiful statues and paintings. The city has a well organized and liberally patronized public school system; a number of colleges, hospitals, charitable and benevolent institutions, a zoölogical laboratory, and a fine university founded in 1224. This famous institution has an extensive system of university courses, 5,150 students, a valuable museum and library, and is amply provided with fine apparatus.

Naples has manufactures of porcelain, cotton textiles, woolen and silk goods, chemicals, perfumery, musical instruments, glass, soap, spirituous liquors, machinery, engines, vehicles, and ships. The export and import trade is very large, being greatly facilitated on account of the convenient harbor in the Bay of Naples, at which terminate several canals and internal railroad lines. In the vicinity of Naples tourists find splendid gardens and vineyards and many ancient ruins, among them remains of Roman temples, tombs, and palaces, and also relics from the ancient cities of Pompeii and Herculaneum. The life of Naples is cosmopolitan, and visitors find there many noted educational and scientific societies and a number of excellent periodicals. It was founded many centuries before the Christian era by the Grecians. The early colonists came from the Grecian town of Cumæ, and the city was named Neapolis, meaning New City. This name was applied to distinguish it from Parthenope, an adjoining Grecian city. It has a population of 564,635. See **Naples, Kingdom of.**

NAPLES, Bay of, an inlet from the Mediterranean, on the western coast of Italy. It extends from Capo di Miseno, its northern limit, to Punta della Campanella, its southern limit, a distance of thirty-five miles. Near its entrance are the islands of Capri, Procida, and Ischia, and just north of it is the celebrated Mount Vesuvius. The natural scenery is remarkable for its beauty, and destructive earthquakes have made its vicinity famous in history. On its northeastern shore is the city of Naples.

NAPLES, Kingdom of, a former political organization of importance in the history of Europe, which originated from the settlements made by Grecians at Parthenope and Neapolis. The first Greek settlements were founded in the vicinity of the Bay of Naples about the latter part of the 8th century B. C. These colonies rose to power and eminence by reason of the industry and warlike qualities of their inhabitants. They existed for many centuries as municipal or federative governments. Rome conquered Neapolis, the last of the Grecian cities, in 290 B. C., and the laws and customs were modified gradually in accord with those of their conquerors. Pyrrhus and Hannibal were unable to conquer it, but in 82 B. C. it fell under the government of the Sulla party, and during that period much damage was inflicted. In the time of the Roman Empire many of the wealthy people favored the region as a residence, largely on account of its splendid climate, fertile soil, and the literary center then existing at Neapolis. It was seized by Odoacer soon after the decline of the Western Empire, and in 190 A. D. became subject to the Goths. Belisarius took the city of Neapolis in 536; Totila sacked it six years later, but soon after it passed to the Lombards, who erected various independent duchies in the region tributary to it.

The Normans conquered the whole country in the 11th century and established Naples and Sicily as a tributary kingdom. Soon after the German Hohenstaufen dynasty secured control, and under its administration notable strides of intellectual and social advancement followed, but in 1266 the Hohenstaufen power was subdued by the popes, who made Charles of Anjou sovereign of Naples and united with his kingdom the two Sicilies. Sicily became independent of Naples in 1282, but the dynasty established by Charles of Anjou governed until 1441, when the Aragon rule succeeded. In the reign of the princes of Aragon, France and Spain contended for supremacy, and in the early part of the 16th century Spanish influence predominated. It was governed more than a hundred years by Spanish viceroys. Masaniello led a well-organized revolt against Spanish supremacy in 1647. In this movement he was assisted by the duke of Guise, but after the capture of the latter the country became again subject to Spain.

In 1707 Naples passed from Spanish sovereignty to Austria, but in 1735 it was made an independent monarchy with Don Carlos, the founder of the Bourbon dynasty, as sovereign. Ferdinand IV., son of Don Carlos, succeeded his father as king when that sovereign became king of Spain, in 1759, and in 1798 Naples was formed into a republic under the influence of republicans from France, but soon afterward the king was restored by royalists. A French army of invasion entered Naples in 1806, when it was conquered and Napoleon proclaimed his brother Joseph king. Two years later Joseph was removed to Spain, and his brother-in-law, Joachim Murat, ascended the throne of Naples. Murat was defeated in 1815 by Ferdinand, who executed the king and proclaimed himself Ferdinand I. He died in 1825, being succeeded by Francis I., and, when that sovereign died, in 1830, his son became king as Ferdinand II. The latter

died in 1859 and was succeeded by Francis II. In 1860 the revolution under the leadership of Garibaldi attained success in opposing the Bourbon government, and in 1861 both Naples and Sicily were incorporated with the kingdom of Italy.

NAPOLEON (na-pō'le-ọn), **Victor Jerome Frederick**, claimant to the throne of France, born July 18, 1862. He descended directly from the Napoleon family, was by the will of his father, Prince Napoleon, made the prince imperial, and in 1886 was obliged to leave France by an expulsion act. After 1891 he became recognized as the head of the Napoleon family and of the Bonapartist party.

NAPOLEON I., emperor of the French, born at Ajaccio, in the island of Corsica, Aug. 15, 1769; died on the island of St. Helena, May 5, 1821. His father was an advocate named Charles Bonaparte, and his mother's name was Letizia Ramolino. He enrolled at the military school at Brienne as a pensioner of the king in 1779, where he remained a little more than five years. Shortly after he entered the military school of Paris, where he received a commission as lieutenant of artillery in 1785. He was located in a garrison at Valence when the French Revolution began, and soon after made an unsuccessful attempt to conquer the Corsican cities for France. In 1793 he was made lieutenant-colonel of artillery, and shortly after succeeded in capturing Toulon from the British, a successful strategic achievement that caused him to be made brigadier-general of artillery in February, 1794. He was planning in 1795 to engage for military service with the sultan of Turkey, but in the early part of that year the convention was thrown into great peril by the mutinous spirit of a large number of people at Paris, and Napoleon was finally selected as the most available man to command the national forces. A force of the national guard numbering 30,000 men undertook to reach the convention at the Tuileries, but Napoleon provided for its defense with 5,000 troops. He placed his forces in line and sent a destructive volley of grape shot to clear the streets, mowing down those engaged in the mutiny with great destruction, and not only disbanded the national guard, but ended the insurrection by disarming the populace.

NAPOLEON BONAPARTE.

Immediately he was given command of the army of the interior, and on March 9, 1796, was married to Josephine Beauharnais, widow of General Beauharnais. Soon after he assumed supreme command of the army of Italy, which he found in a wretched condition, but his tact was equal to the task of organizing and providing an adequate force, though the French forces numbered but 40,000 men, while he was confronted by a force of 75,000 Austrians and Sardinians. On April 11, 1796, he succeeded in securing possession of the Apennines by defeating the Austrians at Montenotte, and soon after followed successful battles that concluded at Lodi on May 10, thereby bringing all of northern Italy into possession of the French. He immediately began to move upon Austria, and that country was compelled to make peace after its army was successively defeated at Bassano, Roveredo, Rivoli, and other points. These successes compelled the pope to cede a portion of his dominion. They also brought about peace treaties with Modena, Parma, and Naples, while the treaty with Austria on Oct. 17, 1797, gave Lombardy, the Netherlands, and the Ionian Islands to France, and Venetia was made a part of Austria.

Napoleon returned in December, 1797, to France, where he was greeted as a hero and as the most celebrated military leader of the world. The directory began to fear his power, and thus decided to have him take charge of an expedition to Africa for the purpose of conquering that country and destroying the power of Engand in that region. Accordingly he embarked in May, 1798, with a well organized army from Toulon, reduced Malta while en route, and on July 1 effected a landing at Alexandria. On July 4 he reduced that city; on the 24th of the month he captured Cairo by winning the battle of the Pyramids, and overran Egypt and Assyria. He was everywhere victorious except at Acre, and his fleet was destroyed in the Bay of Aboukir by Nelson. It was now his ambition to overthrow the Turkish power, but he was attacked by a large force of Turks that landed at Aboukir on July 25. This attack was skillfully repelled and the Turks almost annihilated. Soon after intelligence reached him that the army of France was meeting with disaster at home, and he gave the command of the army in Egypt to General Kleber and returned to France.

The government of France had been unfortunate in satisfying the people, and Napoleon at once was hailed as the right man to restore order and confidence. After securing the coöperation of Moreau and other military men of influence, he abolished the directory on Nov. 9, 1799, and caused the adoption of a new constitution. This constitution provided for three consuls, of which Napoleon was the first consul, Cambaceres the second, and Lebrun the third. However, Napoleon was the real ruler of France, and he and Josephine occupied the palace of the kings of France in the Tuileries. His

government gave vigorous attention to both military and civil affairs, and, after constructing canals and highways and reorganizing the army, he decided to humble the pride of Austria. In 1800 he marched into Italy by way of the Great St. Bernard pass, shortly after defeated the Austrians at Marengo, won the battle of Hohenlinden through the skillful coöperation of Moreau, and by the peace of Luneville acquired all of Italy. Subsequently treaties were made with Portugal, Spain, Bavaria, Naples, Turkey, and Russia, and in 1802 Britain signed the treaty of Amiens. His attention was next directed to the enlargement of civil institutions. Accordingly he reformed local government, established schools, revised the code of laws, founded the bank of France, established universities, defined the powers of the church, and gave encouragement to the development of industrial arts and sciences. The senate in 1802 proclaimed him consul for life, and in May, 1804, he proclaimed himself emperor, being crowned with Josephine as empress in Paris, Dec. 2, 1804. The people gave a decided vote in favor of this action, and immediately he established titles of nobility, created military marshals, and instituted an imperial court.

Napoleon was crowned king of Italy at Milan on May 26, 1805, and his stepson, Eugene Beauharnais, became his viceroy. This course and his policy in annexing large territories to his dominion caused his power to be feared by the European states, and soon after an alliance was formed against him by Russia, Austria, Sweden, and England. Napoleon immediately invaded Germany, where he defeated a large Austrian army at Ulm, captured Vienna, and on Dec. 2, 1805, won the battle of Austerlitz over the Austrians and Russians. These successes were followed by making his brother Joseph king of Naples; his brother Louis king of Holland, and the electors of Bavaria and Wurtemburg, who had rallied to his assistance, were made kings of their respective countries. A large army of Prussians and Russians now gathered at Jena, which Napoleon defeated, and, after capturing Berlin, he established the kingdom of Westphalia for his brother Jerome. In June, 1807, Napoleon defeated the Russians at Friedland, and shortly after a compact was formed between him and Emperor Alexander I., by which Russia was allowed to take Finland from Sweden and annex a portion of Prussian Poland, while the king of Prussia received as a possession one-half of his former dominions.

It was Napoleon's ambition to humble England, an object he hoped to accomplish by closing the principal ports of Europe against that country, but the English army defeated his forces in Portugal. He sent an army against the allied Portuguese and English in 1807, which resulted in the royal family of Portugal settling in the then Portuguese colony of Brazil, and the following year his brother Joseph was made king of Spain, while his brother-in-law, Murat, succeeded to the throne of Naples. The French were finally driven from Spain by the allied army of English and Spaniards, this being known as the Peninsular War and extending over a period of seven years. Austria declared war against Napoleon in 1809, which caused him to enter Bavaria with a large army, but he met defeat at Aspern and Esslingen. However, on July 6 the final battle was fought at Wagram, in which the opposing forces were crushed completely, and as a result Emperor Francis was compelled to cede more of his territory. Napoleon's accomplished wife, Josephine, had borne him no children, hence he divorced her, and on April 2, 1810, married Maria Louisa of Austria. From this union came a son in 1811, who is known as Napoleon II.

Napoleon was in the height of his power in 1810 and 1811, his dominion extending from Hamburg to the Mediterranean and from Vienna to the Atlantic, but his influence began to decline rapidly. He declared war against Russia in 1812 because the czar found it impossible to maintain a continental blockade, and with an army of 550,000 men entered upon his celebrated invasion of Russian territory. The Russians made a stand at Borodino, but were defeated, and by a skillful retreat avoided engagements. They not only fell back with great precision, but also destroyed or carried away all available supplies. This course made it exceedingly difficult for Napoleon to gather support for his immense army, and when he reached Moscow, the city had been reduced to ashes. The winter setting in made it impossible to continue farther pursuit, neither could he subsist at Moscow, and the only thing that remained was an inglorious retreat.

No sooner had Napoleon decided upon this course than extremely severe weather set in, and the Russians took advantage of his dilemma by pursuing him with companies of mounted Cossacks, who harassed his army and destroyed in great numbers the French soldiers, now fatigued and weakened by famine and disease. Not more than 50,000 of his army lived to return, but he immediately ordered a conscription and raised an army of 350,000 men. However, the military spirit of Europe was at its height, and in 1812 the notable defensive alliance was formed by Prussia, Spain, Russia, Great Britain, and Sweden, but the first decisive battle at Lützen, on May 2, 1813, terminated in a victory for Napoleon. All the powers of Europe were now upon him with a force of 400,000 men, but he defeated them at Bautzen and Dresden. Napoleon's retreat to Leipsic became necessary, where he was defeated in the famous "Battle of Nations" on Oct. 16, 18, and 19. In the early part of 1814 he was ready with a new army, and defeated Blücher in four successive engage-

ments, but the allied armies captured Paris on March 30, 1814, and Napoleon proposed to abdicate in favor of his son. This proposition was not accepted, since the allies looked upon him as a disturber of the peace in Europe, and on April 5 he abdicated unconditionally at Fontainebleau. He retained the title of emperor, was given the sovereignty of the island of Elba, and Louis XVIII. was restored to the throne of France.

Napoleon was not to be so easily disposed of, and, taking advantage of the unpopularity of the Bourbons in France, he escaped from Elba after ten months' residence and landed, on March 1, 1815, at Frejus. There he was received with much rejoicing by the army, and immediately began a triumphant march upon Paris. Louis XVIII. fled, while his place was taken by Napoleon, who began at once to raise a powerful army with which to confront the consolidated forces of Europe. The allied armies began an immediate march upon France, but Napoleon planned to defeat them one by one before they could unite. The German army under Blücher was defeated at Ligny on June 16, and Wellington was attacked at Waterloo on the 18th, to which place he had retired. Napoleon was on the verge of success against the English army, but the Prussians under Blücher made a sudden and decisive attack from the rear, and thus the great battle of Waterloo was lost. The allied armies occupied Paris without opposition, and Napoleon abdicated in favor of his son on June 22. He found it impossible to escape from France, and accordingly surrendered to Captain Maitland of a British man-of-war. Louis XVIII. was immediately restored to the throne, and Napoleon confined on the island of St. Helena, where he remained a prisoner under the charge of Sir Hudson Lowe. He was bewildered the last few days of his life, his last words being "head of the army," from which it is taken that he thought himself still in command of his troops. He was buried on the island, but twenty years later the remains were removed to France, where they were placed in a magnificent tomb in the Hôtel des Invalides on Dec. 15, 1840.

NAPOLEON II., only son of Napoleon I. and Maria Louisa, born in Paris, France, March 20, 1811; died in Schönbrunn, Austria, July 22, 1832. The title of king of Rome was given him at birth, and when his father abdicated, he and his mother retired to Vienna. There he was made an Austrian prince by the emperor of Austria with the title of duke of Reichstadt. He received a careful education, was made lieutenant-colonel in 1831, and commanded a regiment in Vienna. The title of Napoleon II. was not assumed by him, but this he acquired when Napoleon III. was recognized, in 1852, by the European governments.

NAPOLEON III., Charles Louis Napoleon Bonaparte, emperor of France, born in Paris, April 20, 1808; died at Chiselhurst, England, Jan. 9, 1873. He was the nephew of Napoleon I., being the youngest son of Louis Bonaparte, king of Holland, who was a brother of the former. Hortense Beauharnais was his mother, under whose charge he was carefully trained in early childhood, but most of his early life was spent in Germany and Switzerland. In 1832 he became the heir to the imperial throne of France by the death of Napoleon II., and until 1836 his life was spent principally as a student and author. In the latter year he resolved to make an effort to secure the throne of France by overthrowing Louis Philippe, and accordingly attempted to come into possession of the garrison at Strasburg. His ambition was not only a failure, but he was captured and sent to America. After remaining some time in Brazil and New York, he returned to Switzerland, where the French government sought his expulsion, but in 1840 he made a second attempt to become the imperial ruler of France. This time he landed from England at Boulogne, where he was placed under arrest, and after formal trial sentenced to life imprisonment in the fortress of Ham. While there he engaged in literary work, and edited "French Dictionary of Conversation." On May 25, 1846, he disguised himself as a workingman and escaped to England.

When the revolution of 1848 broke out, Napoleon returned to France, where he became a member of the national assembly, and when the republic was instituted he was made its president for four years, 5,434,226 votes being cast in his favor out of a total of 7,500,000. In the latter part of 1851 he declared Paris in a state of siege and issued a decree to dissolve the national assembly. He caused the arrest of many opponents to his designs, and anyone disposed to oppose him publicly on the streets was ordered shot down by the military forces. In December of the same year he issued a second decree, in which the presidential term was extended to ten years and universal suffrage was established. On the 20th of the month an election was held in which nearly a unanimous vote was cast in favor of making him president for ten years, and immediately he began to plan for a restoration of the empire. The national guard was reëstablished in 1852 and a revised constitution secured, and on Dec. 1, 1852, he was proclaimed emperor with the title of Napoleon III. He married a Spanish lady, Eugenie Marie de Montijo, countess of Peba, on Jan. 29, 1853, who made his court one of much brilliance and fashion. His foreign policy at once became vigorous, and in 1854 he joined England in declaring war against Russia in the interest of Turkey. It is known as the Crimean War, and ended with Russian defeat in 1856. In 1859 Napoleon took up arms against Austria to free Italy, but, after winning victories at Magenta and Solferino, the peace of Villafranca was concluded. By its terms Austria ceded

Lombardy to Italy, and France secured the provinces of Nice and Savoy. France joined with Spain and England in 1862 for the purpose of requiring Mexico to redress injuries, but the two allies soon withdrew, and Napoleon conquered the country with his own forces and made Maximilian, archduke of Austria, its emperor. When Napoleon withdrew his army, in 1867, Maximilian was made a prisoner and executed.

The successful war prosecuted by Prussia against Austria in 1866 excited the jealousy of Napoleon, and he sought to interfere with the establishment of boundary lines. When Spain invited Prince Leopold of the German house of Hohenzollern to become the Spanish king, he made it a pretense to declare war against Prussia, in 1870. He assumed chief command of the French army on July 28, 1870, but on September 2 was compelled to surrender at Sedan, and was carried a prisoner of war to Germany. The French army was unsuccessful in every battle before the remarkable enthusiasm of the imperial forces of the German Confederation, and the power of Napoleon ended with his capture. Empress Eugenie fled to England two days after the surrender, while Napoleon was kept a prisoner of war at Wilhelmshöhe until peace was declared, when he joined the ex-empress at Chiselhurst. His only child, the prince imperial of France, was born in Paris, March 16, 1856, and on June 1, 1879, fell in battle against the Zulus in South Africa. He was educated in Belgium and England, and in 1879 joined the English military forces in South Africa. He is often mentioned by his imperial title, Napoleon IV.

NARCISSUS (när-sĭs'sŭs), a beautiful youth mentioned in Greek mythology, and who is described as the son of the river god Cephissus. It is related that Echo fell in love with him, but he failed to return her affection, on account of which she was so grieved that she gradually pined away until she became a mere shadow of her former self, and at length nothing remained of her except her voice, which henceforth gave back with true fidelity every sound that was uttered in the hills and vales. Narcissus was punished by Aphrodite, who caused him to fall in love with his own image, which he beheld while looking at a fountain. His unrequited love caused him to waste away, and the gods changed him into the flower that bears his name.

NARCISSUS, a genus of popular flowering plants, most of which are native to Europe, but many of them have been widely naturalized and greatly improved by cultivation. The plants are bulbous, the stems rush-like, flowers bell-shaped, and the fruit formed like capsules with globose seeds. Among the favorite varieties are those known as daffodils, jonquils, white narcissus, and polyanthus narcissus, these and others being cultivated extensively in gardens for ornamental purposes. The fragrance is admired. Perfumes made of the flowers are used in India for headache. Large quantities of narcissus are marketed in early

NARCISSUS.

spring by gardeners located near New York and other large cities.

NARCOTIC (när-kŏt'ĭk), a substance that relieves pain and produces sleep, if administered in small doses, by diminishing nervous action. When given in moderate doses most narcotics have a stimulating effect, but in large quantities they produce stupor, coma, and convulsions, and in excessive doses cause death. In medical use narcotics produce narcotism; that is, they bring the system under the influence of narcotics; while their continued use brings on narcosis, an exaggerated effect or influence of continuous use of narcotic substances. Among the different substances classed as narcotics are tobacco, alcohol, camphor, opium, belladonna, hemlock, aconite, digitalis, henbane, and many others.

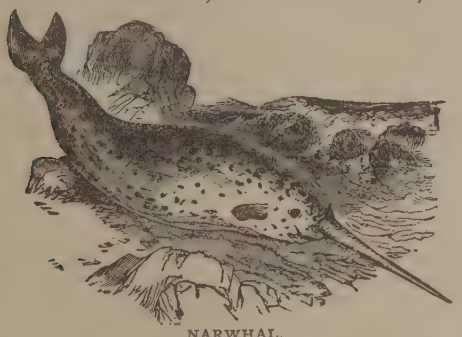
NARRAGANSETT BAY (năr-a-găn'sĕt), an inlet from the Atlantic Ocean, extending a distance of twenty-eight miles into Rhode Island. Its upper part is known as Providence Bay. The bay is from three to twelve miles wide, is well guarded by lighthouses, and contains a number of beautiful islands, among them Prudence, Rhode Island, and Canonicut. Among the rivers that flow into the bay are Pawtuxet, Providence, Taunton, and Pawtucket.

NARRAGANSETTS, an Indian tribe of the Algonquin family, and formerly found in the regions of Rhode Island extending along the west shore of Narragansett Bay. They were generally more peaceable than most of the Indians of New England. In 1636 Roger Williams found a safe refuge among them, and exercised considerable influence in maintaining peaceable relations between them and the colonists. They ceded their land to the English in 1644, but in the latter part of the 17th century several difficulties

arose, and at the time of King Philip's War they were suspected and attacked by the whites. In the hostilities that followed the tribe was almost annihilated. At present they number about 150, many having been assimilated by the whites. This small remnant occupies a reservation at Charlestown, Rhode Island, but tribal relations have not been maintained since 1880. Many of the Narragansetts have become highly skilled as artisans, and have adopted the habits and language of the whites.

NARSES, eminent Roman soldier and statesman, born in Persian Armenia about 473 A. D.; died in Rome about 568. He was of obscure parentage, became a slave in childhood, and in 538 secured the favor of Emperor Justinian, who appointed him keeper of the privy purse. Soon after he was given a military command in Italy, where he defeated the Goths in several encounters. At Taginæ he engaged the Ostrogoths in battle, in which his opponents were defeated and their king, Totila, slain. Through his successful campaigning the entire Italian peninsula came into possession of the Romans, and he was made prefect of Italy with his seat of government at Ravenna. After the death of Justinian, he was charged with extortion and avarice, and was removed from office by Emperor Justinius II. in 567.

NARWHAL (när'hwal), a sea mammal native to the northern seas. It is frequently called sea-unicorn, or unicorn-whale, be-



NARWHAL.

cause the male has a horn from six to ten feet long extending from the upper jaw. The horn is formed by an enlargement of one of the teeth of the upper jaw, usually the left tusk, though the right is sometimes developed. It is twisted spirally and grooved, and pointed straight forward. The tusk is formed of ivory like the tusk of an elephant, growing from a permanent pulp. It is sometimes found in the female. The narwhal attains a length of from fifteen to twenty feet. It is whitish in color with gray or darker spots, and has no dorsal fin. The female has no true teeth. The narwhal is found most frequently in the vicinity of the 80th parallel north latitude, where it feeds most commonly on mollusca. It yields an oil more valuable than that of the common whale. Its skin is of use in the manufacture of various articles. The ivory of the tusk is hard and white, and takes a high polish.

NASBY, Petroleum V. See **Locke.**

NASHUA (năsh'ū-ą), a city of New Hampshire, in Hillsboro county, on the Merrimac and Nashua rivers, about forty miles northwest of Boston. It is nicely situated, has electric lights and street railways, excellent public schools, and is connected extensively by important railroad lines. Among its manufactures are cotton and woolen goods, paper, hardware, metal products, earthenware, machinery, railway cars, engines, and vehicles. The city has a public library of 15,000 volumes. An abundance of water power is obtained from the Nashua River. It was incorporated as a city in 1853. Population, 1900, 23,898.

NASHVILLE, a city of Tennessee, capital of the state. It is situated in Davidson county, on the Cumberland river, about 185 miles south of Louisville. Nashville is the focus of several important railroads, giving it excellent commercial advantages. Among the manufactures are flour, cotton and woolen goods, vehicles, furniture, ironware, oil, leather, spirituous liquors, machinery, paper, hardware, and tobacco. In 1897 it was the seat of a centennial exposition in commemoration of the admission of Tennessee into the Union. Its notable public buildings include the state capitol, an insane asylum, the penitentiary, the Central Tennessee College, Roger Williams University, Vanderbilt University, Nashville University, Nashville Medical College, Fisk University, several fine public schools, and a number of other important educational institutions. The city is lighted by electricity, has an extensive system of street railways, pavements, public parks, and several well-selected libraries. In December, 1864, it was the scene of a battle between the Union army under General Thomas and the Confederates under General Hood, when the latter were defeated. It has a growing trade in cereals, live-stock, and merchandise. Population, 1900, 80,865.

NASHVILLE, University of, an important educational institution at Nashville, Tennessee. It was founded in 1785 as Davidson Academy, became the University of Nashville, in 1826, and since 1855 has had attached a military training department. The institution is co-educational, has 750 students, and a library of 15,000 volumes.

NASMYTH (nā'smith), **James**, engineer and inventor, born in Edinburgh, Scotland, Aug. 19, 1808; died in London, May 7, 1890. He secured the early part of his education in the public schools, later entered the High School of Arts, and completed his training at the Edinburgh University. He settled in London in 1828, where he secured employment as an engineer, and in 1832 established himself as an engineer in Manchester. His

most important invention was completed in 1839, when he finished the construction of the steam hammer, which he patented in 1842. His other inventions include a steam pile-driver and a safety foundry ladle. Nasmyth also secured a reputation as astronomer and author. He published "The Moon" and "Remarks on Tools and Machinery."

NASR-ED-DEN (näs'r-ed-deen'), shah of Persia, born April 4, 1829; assassinated May 1, 1896. He became the ruling sovereign of Persia on Sept. 10, 1848, succeeding his father, Huhammad. When the Turkish and Russian war began, in 1853, he declared neutrality, but later sided with Russia. He traveled extensively in Europe, and became distinguished because of his liberality in favoring the establishment of telegraphic communications and other modern institutions. His reign was prosperous and successful, and his assassination was brought about chiefly because of jealousy by persons who desired to hold official position.

NAST, Thomas, caricaturist, born in Landau, Germany, Sept. 27, 1840; died Dec. 7, 1902. He came to the United States in 1846, began the study of drawing at an early age, and when fifteen years old was employed on "Frank Leslie's Illustrated Newspaper" as a draftsman. The "New York Illustrated News" sent him as special artist to England in 1860, and later he went to Italy for the purpose of sketching from the military movements of Garibaldi for the illustrated papers of New York, Paris, and London. In 1861 he came to the United States to draw war sketches for "Harper's Weekly." Subsequently he settled in New York as an artist, producing many popular drawings in relation to political subjects, and while there invented the popular allegories known as the Tammany Tiger and Republican Elephant. After 1885 he spent much time lecturing on crayon-drawing. Among the works illustrated by him are Nasby's "Swinging Round the Cerkle;" Dickens' "Pickwick Papers;" Nast's "Illustrated Almanac," and Dickens' "Pictures from Italy." In 1902 he was appointed United States consul general at Guayaquil, Ecuador.

THOMAS NAST.

NASTURTIUM (năs-tûr'shŭm), a genus of aquatic herbs of the mustard family, known generally as the water-cresses. The leaves in most species are pinnate, the flowers yellow or white, and the seeds are borne in a marginless pod in which they are arranged in two irregular rows. A species known as the garden nasturtium has a stem about eight feet long, and is cultivated as a climbing annual. The name is applied also to a number of species of climbing plants of the geranium family, with which is included the Indian cress. They are cultivated for

NASTURTIUM.

their handsome spurred flowers, which are of various colors, but usually crimson, scarlet, orange, yellow, or spotted. The fruit and flower buds have a pungent aromatic flavor and are pickled in vinegar, while the tender shoots are used as a salad. Some species grow from cuttings, but several kinds are raised from the seed.

NATAL (nä-täl'), a colony of Great Britain, situated on the eastern coast of South Africa, immediately north of Cape Colony and east of the former Orange Free State. It has an area of 22,461 square miles. Its seacoast has a length of 375 miles, and the only important harbor is at Durban. The soil is generally fertile, especially for a distance of about fifty miles inland, and along the western boundary are extensive ranges of the Dragensberg Mountains. Numerous rivers supply convenient drainage, among them the Untamkulu, the Tugela, the Umlaze, and their tributaries. The agricultural products embrace tobacco, coffee, sugar-cane, oats, cotton, corn, wheat, and tea. Valuable forests extend along the tablelands of the western part and yield excellent lumber. The mineral products include limestone, coal, gold, marble, ironstone, and mineral oil.

As a whole, the climate is not only favorable to the production of fruit, vegetables, and cereals, but is agreeable and healthful. Among the domestic animals are cattle, horses, swine, and poultry. Many kinds of wild animals are still found in the newer portions, among them antelopes, hyenas, leopards, lions, ant-bears, jackals, porcupines, crocodiles, and numerous varieties of birds. Its average temperature is about 65°, and the rainfall is thirty-four inches, but occasionally droughts occur, while locusts and rinderpest are not infrequent. The export and import trade is chiefly with Great Britain. About 800 miles of railway lines have been constructed and others are projected. Common and high schools have been established by government grants. Missionary stations are maintained by a number of American and European societies, and con-

siderable progress has been made both in educational and industrial arts among the natives.

Vasco da Gama discovered the southeastern coast of Africa in 1497, and through his influence the Portuguese name Terra Natalis became applied to the entire region. British oppression caused many Boers to leave Cape Colony in 1836. They founded a permanent settlement at Port Natal, now called Durban, in 1839, and established an independent republic with Port Natal as its seat of influence. Later the capital was transferred to Pietermaritzburg, where it still remains. The British considered the existence of the republic incompatible with their interests. Hence, in 1843, they entered upon a campaign of conquest, and the following year annexed it to Cape Colony, but in 1856 it was made a separate colony. The government was for many years exceedingly unpopular among many of the white inhabitants and natives, because of which extensive and periodic wars resulted. The Zulu War of 1878-79 was particularly destructive to the life and property of the settlers, and at various times since then there have been formidable insurrections.

The legislative authority of Natal is vested in a council and assembly. Its executive authority rests in the governor, who is appointed by England, and there is a colonial judiciary to give interpretation to the laws. The governor is assisted by a colonial secretary, minister of education, premier, attorney-general, colonial treasurer, minister of public affairs, and minister of public work. Pietermaritzburg is the largest inland city, and has direct railroad connections with interior points and Durban. Other cities of note include Richmond, Verulam, Graytown, Harding, and Newcastle. The total population is estimated at 950,000, consisting chiefly of Kaffirs, though there are about 60,000 whites and 61,000 Indians. Natal was the scene of several battles in the Anglo-Boer war beginning in 1900.

NATCHEZ (năch'ez), a city in Mississippi, county seat of Adams county, on the Mississippi River, 275 miles northwest of New Orleans. It is a port of entry, has good steamboat and railroad connections, and is noted as an extensive cotton and produce market. Among the manufactures are cotton goods, clothing, ice, ironware, tobacco products, and machinery. The city has good municipal facilities, including pavements, electric lights, waterworks, and street railways. Its chief buildings are the county courthouse, a Jewish synagogue, a Roman Catholic cathedral, and a number of fine school and church edifices. The city was first settled by the French in 1716. It was the scene of a massacre by Indians in 1849, and in 1862 was captured for the Federals by Admiral Farragut. Population, 1900, 12,210.

NATICK (nā'tĭk), a town of Middlesex county, Massachusetts, on the Charles River, about sixteen miles west of Boston. It has excellent railroad connections, good municipal facilities, and manufactures of boots and shoes, carriages, furniture, toys, woodenware, and clothing. John Eliot, the Indian apostle, secured a grant of the land now occupied by Natick, and until 1721 the community had a constitution modeled after Exodus xviii. The town was incorporated in 1781. Population, 1900, 9,488.

NATIONAL DEBT, the whole amount of money that a national government has stipulated to pay, whether the payments are to be made to other governments, to corporations, or to individuals. A national debt is now an institution of all civilized countries. The ability to contract such a debt depends principally upon the stability of the government, its natural resources, its means of military defense, and its various industries. Usually a national debt is created as a means to carry on military operations or commercial enterprises. The creation of such an obligation does not depend so much upon the ability of the nation to repay the money as it does to provide sufficient revenue to pay the interest, and to keep the principal within a reasonable limit as compared to the intelligence and natural resources of the country. Besides, a nation is the sole judge of its own solvency, and it may not only repudiate its debts, but even during entire solvency the original obligations upon which the money was borrowed may be materially changed by its legislative authority. However, recklessness on the part of a nation has the same effect as in an individual, and as a result its credit may be destroyed and its power to borrow money become exhausted. In former periods it was quite impossible to contract large national debts even by the most powerful governments, and at that time a policy of collecting funds for extraordinary contingencies was adopted by many nations, as in the case of early Rome, where a sacred treasure was accumulated from certain sources and kept secure in the temple of Saturn. This policy is still a part of the existing method of the German Empire, which nation, while maintaining a national debt, also has invested funds to offset its liabilities. For instance, in 1882 the debt of Germany amounted to about $120,000,000, while the invested funds aggregated $185,000,000, thus having to its credit $65,000,000 above its aggregate indebtedness.

The established governments did not begin to contract national debts until extensive systems of credit became recognized, and ever since the bonds, or evidences of indebtedness, of the various nations have been kept on the markets of the world. As a general rule the quotations have varied according to the rate of interest, the time specified for payment, and the stability of the nation issuing the bonds. Many writers on economics have advanced the theory that ultimately the vast indebtedness of nations

would not only ruin their credit, but also lead to a widespread repudiation of their obligations, but fears of this character are in the main groundless, since a world policy of nations requires them to meet their obligations or become merged into other governments that do have ability to make good the indebtedness. On the other hand, it has been asserted by writers of recognized authority that the institution of a national debt is the first evidence that a nation trends toward civilization. This is noticeable particularly in the case of Japan, where only a comparatively short time ago no national debt existed, but with the rise of its extensive industrial activity, such as the establishments of railroads, canals, harbors, manufactories, schools, and highways, there has grown a national debt quite as large as that of many European countries.

The usual way of instituting and maintaining a national debt is by the issuance of bonds. These bonds are made to mature at a definite time and bear a specified rate of interest, which is payable quarterly, semi-annually, or annually, and the particular kind of money in which the obligation is to be paid is especially named in the bond. In the United States the bonds were formerly payable in lawful money of the United States, but at present they are payable in coin. Besides its resources of securing money upon bonds, the government has in circulation paper currency known as greenbacks, which are virtually a part of the debt of the nation, but they bear no interest, and are payable at the United States Treasury on demand. To defray the interest and reduce the national debt the United States government maintains a tariff tax on imports, and the so-called excises on spirituous liquors and tobacco. At divers times stamp taxes were also provided, under which it became necessary to attach revenue stamps to various documents, and taxes upon the incomes of individuals were maintained in different periods.

The national debt of the United States dates from 1789, when the American colonies became a united nation. At that time the country suffered from the distressing war of the Revolution, when irredeemable paper money was issued and the young nation had no adequate income. Money had been borrowed from Holland and France, and on Jan. 1, 1790, the United States assumed the payment of the debts of the several states, the total indebtedness amounting at that time to $71,000,000. The War of 1812 caused a great increase of the national debt. In 1816 it amounted to $127,334,933, but the abounding prosperity then existing made it possible to pay off the entire sum by 1835, and for a few years the debt was but a few thousand dollars. The Mexican War caused another enormous increase, until in 1850 it amounted to $63,452,773. At the beginning of the Civil War, in 1861, there was a national indebtedness of $90,580,873, but the expenses of the first year of the war were estimated at $300,000,000, while the revenue was only $60,000,000. To make up the necessary funds the government began to borrow heavily instead of taxing, and the long struggle that followed made it necessary to resort to borrowing to an unfortunate extent. In 1900 the national debt, less the cash in the treasury, was $1,107,711,257. The contracted national debt of the United States since the beginning of the Civil War is given in the following table:

1862.....	$ 524,176,412	1875.....	$2,232,284,531
1863.....	1,119,772,138	1880.....	2,120,415,370
1864.....	1,815,784,370	1885.....	1,863,964,873
1865.....	2,680,647,869	1890.....	1,552,140,202
1866.....	2,773,236,173	1895.....	1,676,120,983
1870.....	2,480,672,427	1900.....	2,136,961,091

It is a remarkable fact that the rate of interest has been decreasing steadily on national debts. In many countries the rates range from 2 per cent. to 5 per cent. per annum, though in many cases the interest is from 3 per cent. to 6 per cent. Where the rate of interest is favorable to investors and the country credited with ordinary stability, bonds usually sell at a premium, though there are instances in which the bonds are sold at a considerable discount. France has been remarkably prosperous with an enormous national debt, its prosperity ranging generally with the increase of its indebtedness. This fact is accounted for by economists in that an abundance of money lessens its purchasing power, and correspondingly increases the price of labor and the products resulting from applied intelligence. Hence, with an increase of indebtedness in France and other countries there has been a corresponding increase in the amount of money in circulation per capita, and the business prosperity has been materially influenced as a consequence. See **Debt.**

NATIONAL LIBRARY. See **Congressional Library.**

NATIONAL PARK. See **Yellowstone Park.**

NATURAL BRIDGE, a remarkable natural formation in the Shenandoah valley, situated west of the Blue Ridge Mountains, about fourteen miles west of Lexington, Virginia. It is a natural bridge of rock spanning an opening eighty feet wide. The bridge has a width of one hundred feet and is 215 feet high.

NATURAL GAS, a product found in deposits in many countries. It is regarded by chemists as resulting from the decomposition of animal and vegetable remains. Its principal element is marsh-gas, but it also contains oxygen, hydrogen, nitrogen, carbonic acid, ethylene, and carbonic oxide. Natural gas varies in composition according to the different regions where it is produced, and lacks some of the elements that form manufactured illuminating gas, particularly the hydrocarbon. Accounts of burning springs and wells have come down to us from

remote antiquity, especially from different regions of Asia and Europe, and fissures from which gas escaped were discovered in the early settlements of America. In 1821 the first attempt to utilize the gas in America was made at Fredonia, New York, where it was used for illuminating purposes.

The first extensive gas deposits were discovered in the Ohio valley, in 1866, while drilling for petroleum, but its commercial value did not become apparent until 1884, when the enterprise of prospecting was conducted in various sections of the United States. Extensive deposits are utilized at present in Pennsylvania, Ohio, Indiana, southeastern Kansas, Texas, and various regions of Eurasia and Africa. It is usually found in connection with petroleum, but sometimes with salt beds, and issues from the openings with more or less force. In many cases the pressure is very great. Owing to this pressure it has been found practical to conduct the gas through pipes long distances for illuminating and manufacturing purposes. The greatest natural gas fields extend along the west side of the Alleghany Mountains, from New York through Pennsylvania, West Virginia, Ohio, Indiana, Kentucky, and Tennessee, the most productive fields being in the Ohio valley. The gas fields of Kansas are located in the vicinity of Iola, where a single well supplies 10,000,000 cubic feet per day, and enormous quantities are used to reduce lead and zinc ores produced in the vicinity of Joplin, Missouri. Remarkably productive gas deposits are located in the vicinity of Beaumont, Texas. In some cases it is necessary to go 3,500 feet to reach the gas deposits, and in many instances the pressure is sufficient to lift many tons into the air. However, it has been found that the pressure gradually lessens after flowing for a long period of time. This circumstance has led some writers to believe that the supply will become exhausted in a comparatively short period.

NATURALIZATION (năt-ū-răl-ĭ-zā'-shŭn), the process by which an alien or foreigner may become a citizen in the country where he wishes to reside. Naturalization laws are passed in the different nations according to regulations and rules recognized by treaty with the countries from which the aliens have emigrated. The process involves renouncing allegiance to one country, and assuming the duties of citizenship in another. This right was recognized by the United States from the beginning of its history, and a denial of it by Great Britain brought on the War of 1812. England at that time held that an Englishman always remains an Englishman, and accordingly impressed citizens of the United States into its service. It undertook to punish for treason a number of individuals who had taken up arms against that country. However, in 1870 Great Britain recognized the right of its subjects to renounce allegiance to that country, though it and its colonies had previously recognized the right of aliens to become citizens. Before the adoption of the constitution the several states had the exclusive control of naturalization, and accordingly the period for becoming citizens varied widely as to time for completion and in other respects. At present the entire matter is regulated by national law, and the time required to complete naturalization is five years.

A declaration under oath setting forth that the alien desires to become a citizen may be made immediately on coming to United States territory, but in all cases there must be two years between the first declaration and the completion of citizenship. Persons who have served in the army or navy of the United States are entitled to a reduction from the five year limit, by the exact length of time of such service. Children of persons duly naturalized at the time the children were under the age of twenty-one years become citizens when they reach the legal age of twenty-one years. The right to vote comes from the state, hence the state may confer upon persons who are not citizens of the United States the right to vote. Thus, in several states the right of suffrage is conferred upon persons of foreign birth otherwise qualified, who have declared their intentions to become citizens of the United States. The states where this regulation now exists include Arkansas, Florida, Georgia, Indiana, Kansas, Michigan, Minnesota, Nebraska, North Carolina, Oregon, Texas, and Wisconsin. Several of the states require that the individual shall be able to read the constitution in the English, and that he shall be a tax-payer.

The naturalization laws of Great Britain are not exclusively national, but depend upon the particular colony in which application is made, though in most cases five years' residence or military service is required. In Germany the laws permit naturalization of all persons coming from countries that recognize their right to renounce allegiance, and also make the additional requirements that the individual possess a good moral character, visible means of support, and residence in imperial territory. France recognizes naturalization after three years' residence, but anyone residing there for ten years becomes a citizen for all purposes without any preliminary ceremony. Naturalization of the husband is recognized as sufficient to entitle the wife to all the privileges accorded to her sex in any of the countries recognizing naturalization. In nearly all countries the minor children of a father who became a naturalized citizen gives them the full privileges of citizenship when they attain majority.

NATURAL SELECTION, a term applied by Darwin in relation to his theory of the origin of species. According to it some plants and animals survive and propagate under conditions of nature favorable to

them, while the forms not peculiarly fitted to survive disappear. This theory implies that all species of plant and animal life vary more or less through the different climatic epochs, and that the structure of the young becomes modified in relation to the parent, and that of the parent in relation to the young. It is assumed that at first only a single species or a few varieties existed. As these became perpetuated under natural selection, new characters differing widely from the original stock appeared, the new forms being different from the original both in structure and function to such an extent that they became regarded as new species. Artificial selection is a term applied in opposition to natural selection, and has reference to the domestication and breeding of such animals as horses, swine, cattle, sheep, dogs, and many others. The methods employed in artificial selection are in imitation of the processes found in nature, the product derived from such process often differing to a great extent from the original type. Natural and artificial selection imply the survival of the types best fitted to be perpetuated naturally, or for the purposes of use in commercial or other enterprises. The mule is a good example of the profitable employment of artificial selection.

NAUGATUCK, a town of Connecticut, in New Haven county, on the Naugatuck River, twenty-five miles southwest of Hartford. The surrounding country is fertile, producing cereals, grasses, and dairy products. It has railway facilities and a considerable trade in merchandise. Waterworks, electric lights, and rapid transit are among the general improvements. Its noteworthy buildings include several fine schools and churches. Population, 1900, 10,541.

NAUTILUS (nạ'ti-lŭs), the name applied formerly to a large genus of mollusks. At present it is confined to only three existing species. Fossil remains indicate that more than one hundred species lived in the different geological periods. Those now existing are found in the southern seas, where they creep at the bottom of the water. The nautilus is distinguished from the cuttlefish by a shell. It lives in the outer chamber of the shell and has a number of tentacles around the mouth. Its eyes are sac-like, and the head and arms protrude from the many-chambered shell, which is formed like a spiral. The animal occupies the inner chamber when young, and each chamber is occupied in succession by the animal advancing at intervals as it increases in size, forming the larger chamber and partitioning off the last one occupied. The species known as pearly nautilus has a thin crust covering the shell and beneath it is a porcelain-like formation. At the interior the structure is of mother-of-pearl. Another common variety is known as the paper nautilus or argonaut, so called from its alleged tendency to lift its arms while swimming at the surface of the water. The different species propel themselves by means of squirting water from the arms. They are thought to be able to store air in the unoccupied chambers of the cells, and by filling or exhausting them of air to change the total weight for the purpose of rising or sinking in the water. The food consists mostly of crustaceans. Many of the natives of the East Indies and other tropical islands catch the pearly nautilus for its shell, which they use in making ornaments, while the Fijians and others esteem it as an article of food.

NAUTILUS.

NAUTICAL ALMANAC. See **Almanac.**

NAUVOO (nạ-vōō'), a town of Hancock county, Illinois, located thirty-two miles south of Burlington, Iowa. It is surrounded by a farming country and has railroad connections. Nauvoo has several schools, a Catholic academy, and a number of manufactories. It was founded in 1840 by the Mormons, and in 1846 had a population of fully 15,000. Joseph Smith and his followers erected a fine temple, but after the assassination of that prophet the structure was destroyed. Subsequently a community of French socialists was established in Nauvoo under M. Cabet, but the experiment proved a failure. Population, 1900, 1,321.

NAVAJOS (nä'vä-hōs), an Indian tribe of North America, belonging to the Athabascan family, and formerly found in the northern part of Arizona and New Mexico. They first became known to the Spaniards in 1630. Attempts made by the Mexicans to reduce them failed at different times, but in 1863 they were defeated by Colonel Carson. They now occupy a large reservation in the adjoining corners of Arizona, Colorado, New Mexico, and Utah, where they carry on farming and stock raising. The principal products are corn, wheat, fruits, vegetables, horses, cattle, mules, goats, and sheep. Government schools are maintained for their instruction, and many have shown remarkable aptitude in taking up the civilized arts of industry and education. However, they have been persistent in maintaining their language and customs. The tribe at present numbers 20,500.

NAVAL ACADEMY, a government training school maintained by the United

States authorities at Annapolis, Maryland, which trains cadets for the American navy on a similar basis as those trained for the army at the West Point Military Academy. The institution is situated on a site near the Severn River, which was formerly occupied by Fort Severn. Fifty acres of ground are inclosed by walls, but in addition there is a tract of 109 acres, and these, with the facilities afforded by the Severn River, provide ample accommodations for practical exercises and instruction, both on land and in the manipulation of vessels on water. The institution is supplied with vessels for practical training. It has an efficient corps of instructors and an attendance of about 285 students. Its course of study provides four years of academic work, which is supplemented by two years' practical instruction at sea. The course is uniform for all students the first three years, while in the fourth year the study of engineering is pursued by engineer cadets. Graduates are commissioned according to the branch of service for which the cadets have prepared, the positions being that of ensigns, second lieutenants of marines, and assistant engineers. Cadets receive their appointment from members of the house of representatives, though eleven are appointed by the president of the United States. Searching examinations in relation to physical and educational matters are required after appointment, and only those showing a high degree of qualification are admitted.

NAVARINO (nä-vä-rē'nō), or **Neocastro**, a seaport on the southwestern coast of Morea, in Greece. It is situated in the nomarchy of Messenia, on the Bay of Navarino, and is noted for its excellent harbor and importance as a strategic point. Old Navarino is located at the northern part of the bay, Navarino on the southern shore, and the island of Sphagia is at its entrance. The bay was the scene of a noted naval battle in 425 B. C., when Cleon commanded the Athenian fleet against the Spartans, and after prolonged encounters attained a decisive victory. Another decisive battle occurred there Oct. 20, 1827, when the allied navies of the Russians, French, and British destroyed the navies of Egypt and Turkey.

NAVARRA (nä-vär'rä), a province of Spain, but formerly a European kingdom. It is situated in the northern part of Spain, being bounded on the north by France. The province contains an area of 4,040 square miles, and a population of 23,118. Ranges of the Pyrenees traverse the northern part, where extensive forests abound, and the regions in the southern part are noted for their fertility, being situated in the valleys of the Ebro, Aragon, and Arga rivers. The mountainous districts contain deposits of copper, iron, lead, salt, and other minerals. Among the agricultural products are grasses, wheat, corn, rye, flax, and hemp. It also has extensive interests in the rearing of cattle and the production of fruits, spirituous liquors, cotton and woolen goods, and leather. Several important railroad lines traverse the province. Pamplona is the capital, which is a thriving railroad city of 28,375 inhabitants. The region was formerly occupied by the Vascones, who were conquered in the 5th century by the Goths, and subsequently the district formed portions of different possessions. As a kingdom Navarra included the Spanish province of Navarra and the French departments of Landes and Basses Pyrenees. The kingdom dates from about the middle of the 9th century and ended in 1512, when Ferdinand the Catholic annexed the larger portion to Castile. Subsequently the remainder was added to the French possessions under Henry IV.

NAVARRO (nạ-vär'ō), **Mary Antoinette Anderson**, actress, born in Sacramento, California, July 8, 1859. Her education was secured at the Ursuline Convent in Sacramento, and in 1875 she made her first appearance as Juliet in "Romeo and Juliet" at Louisville, Kentucky. In 1876 she appeared with much success in New York. She made a trip to Europe in 1879, and again in 1883, when she played successfully at the Lyceum Theater in London. On June 18, 1890, she married Antonio F. de Navarro, son of a wealthy Mexican resident of New York City, and shortly after retired from the stage. She published an interesting account of her travels in 1896 under the title "A Few Memories."

NAVEL (nā'v'l), the depression or scar on the abdomen where the umbilical cord of the fœtus was attached. The fœtus communicates with the parent through the placenta, but in the adult the passage is closed, the healing after separation producing the familiar depressed appearance.

NAVIGATION (năv-ĭ-gā'shŭn), the art or science of navigating by means of vessels from one port on the sea or ocean to another by the most available route. The term is applied also to the art of determining the direction and distance of a vessel at sea, and measuring the course and position of vessels. The general working of the vessels by managing the sails, rudder, and other appliances belongs to seamanship. In practice the position of a ship at sea is determined either by keeping a record of the course in which it sails and the distance traversed, or by observing the heavenly bodies by means of spherical trigonometry. The former gives only approximate results, while general accuracy may be obtained by the latter. Vast improvements have been made in the science of navigation since the Middle Ages. Those of material value include the invention of Mercator's chart, in 1569; the institution of tables of meridional parts, in 1579; the invention of Davison's quadrant, in 1600; the application of logarithms by Edmond Gunther, in 1620; the measurement of degrees on the meridian by Richard Nor-

wood, in 1631; and the computation of longitude by Harrison's chronometer, in 1764. At present careful calculation is made of a ship's position in relation to its deviation from a direct course by reason of currents and winds, which is determined by what is known as dead reckoning, though no method may be regarded accurate, except the measurement of heavenly bodies by spherical trigonometry.

Navigation laws were first authorized in the United States under the constitution, the earliest law being passed in 1789. By the terms of this act a tonnage tax of six cents per ton was levied on all American vessels, and one of fifty cents per ton on those owned in foreign countries and entering American ports. An act requiring American registration was passed in 1792, and the following year the coasting trade was closed to foreign vessels. That legislation highly favorable to American commerce should follow the American war of independence was to be expected. It was designed to secure a monopoly of the foreign trade for the United States, giving American shippers the advantage in carrying foreign products. In 1816 the navigation laws of the United States were modeled largely after those of Great Britain, and consuls received their fees from the government. At the outbreak of the Civil War tonnage taxes were renewed. They reached a rate of thirty cents per ton.

NAVY, the entire marine military force of a country under the control of the government, embracing vessels, men in the service, stores, yards, and all appliances. The term is applied quite generally to the entire shipping of a country engaged in trade and commerce, though as commonly understood it refers only to marine forces for aggressive and defensive operations. In ancient times the navies consisted mostly of beaked vessels, which were driven with much force against each other, in a manner similar to the rams used at present, though the propelling force consisted exclusively of oars. An ancient navy was usually made up of a large number of boats, each containing from one to three tiers of oars. The

MODERN BATTLESHIP.

oars were operated by sailors sitting or standing at a convenient place, while sails were provided to be raised when it was designed to reach a point some distance from the place of starting. In the 7th century B. C. efficient navies were supported by the Carthaginians, Persians, Phœnicians, and Greeks. The first naval engagement recorded in history occurred in 664 B. C. between the Corinthians and their settlements established in Corcyra. A notable naval engagement occurred in 480 B. C. at Salamis, when Themistocles with a Grecian fleet defeated the Persians under Xerxes by taking advantage of the narrow straits.

When the fleet of Athens was destroyed in the expedition of 414 B. C. against Syracuse, Carthage became the most powerful naval force, but with the rise of Rome that country established itself as the greatest naval power. The Romans partly discarded beaked vessels and constructed those fitted to carry a large force of armed men, who were trained to fight with arrows and javelins, after running the vessels alongside those of the enemy. Swift-sailing galleys were introduced by the Moors and peoples from northern Europe, the Norsemen being particularly efficient in the construction of vessels calculated to serve in plundering the coasts of civilized nations. Soon after whole fleets were constructed for this purpose by Genoa, Venice, Aragon, France, and Denmark. Venice became the great naval power of the Mediterranean, and laid waste the fleet of Genoa and Turkey, but the development of Mohammedanism gave impetus to Turkish power, and by the 16th century that nation became mistress of the Mediterranean. To counteract Moslem power an alliance of Christian nations followed, and the Turks were defeated temporarily in 1715 at the famous battle of Lepanto. In the early part of the 17th century Spain was the principal power upon the seas, its prosperity being due chiefly to vast colonial successes in America. Holland was the most powerful rival of Spain, though both France and England began to attain eminence as naval powers.

The history of modern navies begins with the destruction of the Spanish Armada in 1588 by the English, but the Dutch for nearly a century after that were recognized as the most important naval power in the world. In the reign of Charles II. a long struggle for mastery between the English and Dutch finally gave the former precedence, and throughout the 18th century the naval forces of England and France were practically equal, though the former were threatened seriously in the reign of Louis XVI. Russia began to develop eminence as a naval power at that time, and the fleets of Holland and Spain were reorganized and strengthened. However, in the early part of the last century Great Britain began to take precedence as the most extensive naval power in the world, and its navy is still the largest of the nations. The first effort to organize a navy in America was made in the latter part of 1775, when thirteen frigates were ordered to be constructed. Some

exploits were made with them in the Revolutionary War, but most of the naval achievements of that conflict were accomplished by the privateers. By 1781 all the English vessels in America were destroyed or captured. At the beginning of the War of 1812 the United States had about twenty vessels, while England had 830. The Americans were so generally successful on the seas that congress made larger appropriations for the construction of vessels.

The first attempt at a protected vessel was made at Toulon, France, in 1859, when the La Gloire was launched, but ironclads did not come into use until after the armored monitor invented by Ericsson proved the efficiency of that class of vessels in the Civil War. In 1864 the United States government had 588 vessels, but after the Civil War the navy was reduced, and in 1882 there were but thirty-eight that were capable of sea-going service. The navy of the United States has been increased materially within the last few years, and now consists of more than one hundred vessels. It includes twelve battleships, twenty cruisers, six double-turreted monitors, and a large number of torpedo boats, the ram Katahdin, many unarmored vessels, and several wooden vessels. According to a regulation established as early as 1819, battleships are named after the States, cruisers after cities, and frigates after the rivers of the United States. The battleship is the most important vessel of the navy. It comprises practically a locomotive force, and consists of a steel hull strengthened below the water line by longitudinal and transverse bulkheads, along the water line with heavy steel armor, and at the front and back by heavy curved protected decks.

The capacity of a battleship ranges from 1,000 to 2,000 tons, the displacement from 5,000 to 12,000 tons, and the speed from fifteen to seventeen knots. Cruisers are vessels next in importance to battleships, and their construction is primarily for speed. They differ from battleships mainly in having little armor along the water line, the protection being chiefly by a thick protected deck, and by lighter plates than are provided on battleships. Cruisers also are smaller, carry a lighter battery, and their offensive and defensive power has been sacrificed for speed. All important fleets are now composed of battleships, armored and protected cruisers, scouts, torpedo vessels, and torpedo boats. Monitors and rams are kept to defend harbors, and gunboats are employed for service in time of peace, for cruising, and for police duties. The principal navies of the world include those of Great Britain, the United States, Germany, France, Russia, and Italy. In the United States the navy is under the control of the secretary of the navy, who has headquarters at Washington. The Spanish-American War of 1898 demonstrated the superior efficiency of the American navy in every respect, particularly by the complete destruction of the Spanish fleets in Manila Bay by Admiral Dewey, and off Santiago de Cuba under Admirals Schley and Sampson.

NAZARENES (năz-à-rēnz′), a term applied by the Jews to the inhabitants of Nazareth, and afterward used to designate the early Christians in Judæa. Later the name was applied to a sect that formed an organization near the close of the 1st century, and who resided principally in Egypt. This peculiar sect, also called Ebionites, held doubts as to the divinity of Christ and adhered closely to the Mosaic law.

NAZARETH (năz′à-rĕth), a town in Palestine, sixty-four miles north of Jerusalem, situated in the region comprising ancient Galilee. It is celebrated principally as the scene of the Annunciation, and for being the home of Christ during his early life. The site of the town is among hills and the houses are principally of stone. It was overlooked by the early church for many years. The Christians first made pilgrimages to it in the 6th century, but at present it contains a Roman Catholic convent founded by Franciscan monks, and a Greek Catholic church, the latter being on the scene of the Annunciation. Visitors are shown the place where Joseph's workshop stood, the table from which the last supper was eaten by the apostles, and the site of the synagogue out of which our Lord was put by his townsmen. The population of Nazareth at present is 6,175.

NEBO, Mount, an elevated mountain peak of Palestine, situated east of the Dead Sea. It is celebrated from the incident relating to the view Moses had from its summit of the promised land, and because it is reputed to be his place of burial.

NEBRASKA (nę-brăs′ka), a central state of the United States, bounded on the north by South Dakota, east by Iowa and Missouri, south by Kansas and Colorado, and west by Colorado and Wyoming. Its length from east to west is 413 miles, width 208 miles, and area 77,510 square miles, being somewhat larger than the combined area of Delaware, Maine, and Tennessee. In the southeastern part of the state the elevation above sea-level is 880 feet, but it gradually rises toward the west and north until it attains an elevation of 6,000 feet, while the average elevation is about 2,312 feet. The drainage is mostly toward the east, the principal rivers flowing into the Missouri, which forms the eastern state boundary. Among its principal rivers are the Platte, North Platte, South Platte, Republican, Loup, Elkhorn, Niobrara, and Big Blue. Many small lakes abound in the north-central part of the state, of which several are saline. Its climate is favorable and healthful, being quite cold in the winter and warm in the summer, but the nights are always pleasant. The annual rainfall averages twenty-two

inches, though in the western part it is not sufficient to mature all classes of cereals, and irrigation has been resorted to for the purpose of redeeming a large area of fertile land. At Fremont the mean temperature is given at 51°, while the temperature of the state ranges from 18° below zero to 95° above.

Most of the forest area of Nebraska stretched originally along the various streams, but at present there are splendid groves and artificially reared forests cultivated chiefly under the tree-claim laws of the United States. Among the principal varieties of timber are the ash, soft maple, elm, willow, box elder, oak, black walnut, red cedar, spruce, linden, pine, and cottonwood. The principal portion of the state consists of high prairie lands, which were originally covered with buffalo grass, but at present blue-joint and cultivated grasses have taken its place in the eastern part, though in the western part large areas are still covered with it. Grapes, plums, crabapples, gooseberries, and many other varieties of wild fruit were abundant, but at present choice varieties of apples, plums, grapes, cherries, and shrubbery are cultivated, and in the southern part peaches are grown. The minerals consist of coal, limestone, sandstone, brick and potter's clay, red freestone, salt, and some iron. The coal deposits are mainly in the southeastern part, but mining has not been profitably established. There are manufactures of beet sugar, soap, tanned goods, tobacco products, spirituous liquors, earthenware, agricultural implements, clothing, woolen goods, and machinery. The state is principally agricultural, the chief products being corn, valued at $65,500,000; wheat, $16,500,000; oats, $11,500,000; hay, $13,750,000; and potatoes, $5,500,000. There are also valuable productions of barley, rye, buckwheat, and poultry. Live-stock is reared extensively, large areas in the western part of the state being exclusively occupied by vast herds of cattle, horses, and sheep. The state has large interests in rearing milk cows, mules, and swine. Railroads penetrate extensively throughout the more densely settled parts of the state, the total railroad lines aggregating 6,125 miles.

Nebraska has a fine system of common schools, the buildings representing a value of $9,875,000. Public high schools are maintained in all the towns and cities, and the whole system of education is liberally supported by state appropriatons and taxation. Normal training is given to teachers at six colleges and four public high schools, and there are adequate institutions for higher education and for benevolent, charitable, and correctional purposes. The state university is situated at Lincoln. It has departments of law, medicine, engineering, arts and sciences, agriculture, and fine arts, and an adequate system of courses. The attendance aggregates about 1,600 students, and its library consists of 45,000 volumes. Among the many excellent educational institutions maintained as private or denominational establishments are the University of Omaha, Bellevue; Union College, College View; Cotner University, Bethany; Doane College, Crete; Creighton University, Omaha; Gates College, Neligh; Fairfield College, Fairfield; Nebraska Wesleyan University, University Place, and York College, York. Church organizations are maintained by all leading denominations, and these are represented numerically in the following order: Methodists, Lutherans, Baptists, Presbyterians, Catholics, United Brethren, and Episcopalians. There are 625 periodicals in the state, of which 530 are weeklies and forty dailies.

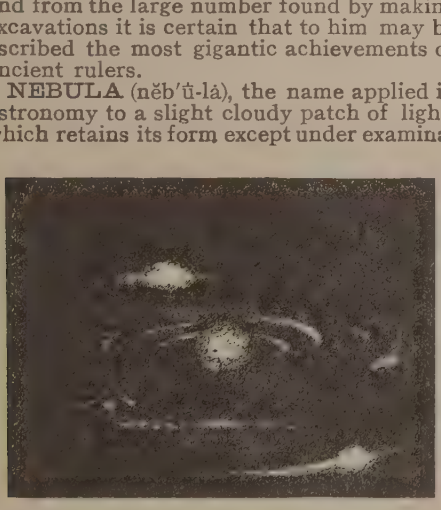
Nebraska was secured in 1803 as a portion of the Louisiana Purchase. Lewis and Clarke were the first white men to visit the region, in 1804-05. It formed a part of the Northwest Territory for many years, and, when the gold excitement of 1849 induced emigrants to go overland to California, settlements began to form. Nebraska Territory was formed in 1854, when it included the Dakotas, Wyoming, Montana, and part of Colorado. Stephen A. Douglas introduced the bill that organized the territory, and its provision for allowing the settlers to exercise their own choice in regard to the existence of slavery not only set aside the famous Missouri Compromise of 1820, but also aroused opposition in the northern states. The territory was reduced to its present limits in 1863, and in 1867 the state was admitted. It has since enjoyed rapid development. Its popular name is Black Water State, and its capital is Lincoln. Other important cities include Omaha, Beatrice, Hastings, Nebraska City, Plattsmouth, Kearney, Grand Island. and Fremont. The census of 1900 accords the state a population of 1,068,539. This includes a colored population of 9,774, or nine per cent., of which 6,269 are Negroes and 3,322 Indians. Of the total population, 52.9 per cent. are males.

NEBRASKA CITY, a city in Nebraska, county seat of Otoe county, situated forty-five miles south of Omaha, near the Missouri River. It is surrounded by a fertile farming and dairying country, and has important railroad connections. Near the city a fine steel railway bridge crosses the Missouri River. Its manufactures embrace farming machinery, vehicles, vitrified brick, tobacco products, spirituous liquors, packed pork, and canned goods. It is an important grair and lumber market, and enjoys a large job bing trade. Among its general facilities are electric lights, pavements, good schools, and waterworks. It is the seat of the Nebraska Wesleyan University, an institution having twenty-five instructors, 500 students, and a fine library. Population, 1900, 7,380.

NEBUCHADNEZZAR (nĕb-ū-kăd-nĕz'-ar), noted king of Babylon, who reigned

from 604 to 561 B. C. He was the son of Nabopolassar, whom he succeeded as ruling sovereign, after that celebrated military hero had governed twenty-one years. Nabopolassar secured possession of the throne of Babylon by defeating the Assyrian monarch. During his reign of twenty-one years he established the basis of the greatest glory of Babylon. When Nebuchadnezzar attained the crown he entered upon a policy to recover provinces that had been lost to his kingdom. In the year 604 B. C. he defeated the Egyptian king, Pharaoh-Necho, near the Euphrates. Subsequently he conquered Palestine and Syria, and not only carried with him the wealth of Jerusalem, but took the Jewish people into captivity to require them to aid in rebuilding the cities of his own empire. In 585 he conquered Tyre, and soon after led his army into Egypt. His latter years were spent in building vast canals, aqueducts, temples, fortifications, and palaces. All the bricks used in constructing improvements bear his imprint, and from the large number found by making excavations it is certain that to him may be ascribed the most gigantic achievements of ancient rulers.

NEBULA (nĕb'ū-lȧ), the name applied in astronomy to a slight cloudy patch of light, which retains its form except under examination through powerful telescopes, when portions of it appear as clusters of more or less distinct stars. About 11,000 nebulæ are now recognized by astronomers. A few of the nebulæ are visible to the naked eye, and by the use of the most powerful telescopes a number are resolvable. It is thought that telescopes still more powerful than are in use at present would make it possible to resolve those that now are apparently irresolvable. Nebulæ are generally supposed to be gaseous bodies of unorganized stellar substances, and that the light is caused by the pressure of gases, though it has been impossible to determine the character of the gases. Five different classes of nebulæ are recognized: stellar nebulæ, so called from having a condensation of light in their center; planetary nebulæ, resembling somewhat the larger planets in appearance; nebulæ stars, consisting of one or more stars surrounded by a circle of light; irresolvable nebulæ, those in which no stars are observable even with the most powerful telescopes; and resolvable nebulæ, which appear as a cluster of separate stars when examined by powerful instruments.



IDEAL NEBULÆ.

NEBULAR HYPOTHESIS (nĕb'ū-lẽr hī-pŏth'ē-sĭs), a theory first suggested by William Herschel (q. v.), according to which the solar system existed originally in the form of a nebula, and that all bodies composing the solar system were originally in a nebular state. This theory was afterward developed by La Place, and with it his name is generally associated. Astronomers who embrace this theory hold that originally nebulous matter was scattered quite uniformly through all space, but later it began to gravitate toward certain centers. Rotation was established by particles moving toward these centers under the influence of gravity, which also produced the spherical form, and as heat was lost by radiation, the body contracted in size, but increased in velocity. Rings were thrown off by reason of excessive velocity; thus a whole system of planets was originated by the central body or sun, and they in turn produced satellites by throwing off zones in a similar manner. That the sun produced our earth and other planets was believed by La Place. On the same hypothesis he reasoned that the rings of Saturn were thrown off by that planet, and that they will in the course of time form spherical satellites. When it became possible by means of powerful telescopes to resolve many nebulæ into stars, it was thought by some writers that the nebular hypothesis was destroyed, but, since some are absolutely irresolvable and are yet known to consist of gases, the nebular hypothesis is based more firmly than ever, though minor points of detail in the original theory have been revised.

NECKAR (nĕk'ar), a river of Germany, rises in the Black Forest, near the source of the Danube, and after a tortuous course of 250 miles joins the Rhine at Mannheim. The Neckar valley is highly fertile, and contains the cities of Heilbronn, Tübingen, Heidelberg, Mannheim, and Constatt. It has been improved for navigation. Steamers ply as far as Constatt.

NECKER (nĕk-kêr'), **Jacques**, statesman and financier of France, born in Geneva, Switzerland, Sept. 30, 1732; died April 9, 1804. In 1750 he became a clerk of a banking establishment in Paris, and, after acquiring a fortune because of the Seven Years' War, he established the famous banking firm of Thellusson & Necker in Paris and London. Later he was made the representative from Geneva to the French court, and in 1775 attained a favorable reputation by publishing several able treatises on political

economy in opposition to the free trade theories advanced by Turgot. In 1776 he negotiated a large loan of money to the French government, was made an assistant of finance in the same year, and in 1777 became general director of finance. His administration of the office was marked with efficiency, and he successfully funded the debt of France, readjusted taxes, established guaranteed annuities under the state, and provided a system of pawnshops under governmental supervision. By suppressing public abuses of state credit, he created a number of enemies at court, and when his "Compte Rendu," a published financial statement, appeared in 1781, he was dismissed and retired to Switzerland. In 1788 he was recalled to the office, the recall being due chiefly to the incompetency of Calonne in managing the financial affairs of the nation. Soon after Necker advised that the states-general be summoned, but his declining the advice of Mirabeau and Lafayette caused him to be dismissed and banished on July 11, 1789, but when the Bastille was stormed, on July 14, the king found himself obliged to recall Necker. He was hailed with much rejoicing on his return to Paris, and at once proceeded with marked vigor to restore order and financial stability. However, it was impossible for him to contend successfully in debate with Mirabeau and other leaders of the national assembly, and, when that body rejected his proposition for a general loan, he resigned his office in September, 1790, and retired to his estate near Geneva. Madame de Stael, who was noted for display and brilliancy in French society, was the daughter of Necker.

NECTAR, according to Greek and Roman poets, the drink of the gods, which, together with ambrosia, constituted their favorite food. It was thought that eagles and doves brought nectar and ambrosia, the drink and solid food of the gods, to the principal deities, and by means of it they were able to enjoy eternal existence, and also to maintain their personal vigor, beauty, and activity. Nectar is described by Homer as a beverage of crimson color, to which he ascribes the power of conferring perpetual youth to all who partake of it, while other writers ascribe to it a taste so delightful that it surpasses all conception.

NEEDLE, an instrument used for carrying a thread through fabric or material of any kind. Needles include a large variety of different classes, among them such as are used for hand-sewing, machine-sewing, embroidery, netting, knitting, and other similar purposes. They are among the first implements invented by man, and those coming down to us as remains from antiquity are mostly of ivory, bone, and wood. Later they were made of bronze and other metals. At present fine steel is employed exclusively in making them for all kinds of sewing, but there are many different sizes and shapes, and they are applied to many different uses. The needle trade is one of vast importance, since there is a sale for this product in all the countries of the world,

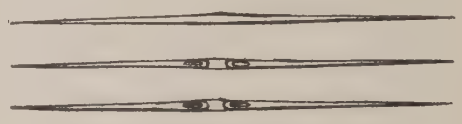


FIGURE *A*.

though the largest manufactures are still in Europe. In the United States there are at present fifty well established manufactories of pins and needles, and the annual output aggregates a value of $2,125,000. The first manufacture of steel needles began at Nuremberg, Germany, in 1370, when a large quantity of square-eyed instruments were made and put on the European market. Later manufactures were established in various countries, the most important of Great Britain being at Redditch, which is still the most important center of needle manufacture of that country. With the invention of sewing-machines there came a marked decrease in the consumption of needles for hand-sewing, though needles for hand-work are still used extensively in many countries and also for various purposes where sewing-machines are abundant. The name is also applied to modifications of ordinary needles used in bookbinding, darning, sail-making, loom-weaving, and various instruments employed in surgery. It is the name of the pointed piece of steel balanced on a pivot in a magnetic compass and of various other objects.

As there are many different styles and classes of needles, the processes for making them are very numerous. The first step involves cutting steel wire into lengths for two needles, and these are sharpened on both ends by placing about fifty at a time on a grindstone. When this has been done, the lengths are cut so as to form two needles. The heads are flattened by a hammer and the eyes pierced with a punch as shown in figure *A;* next the eyes are carefully trimmed

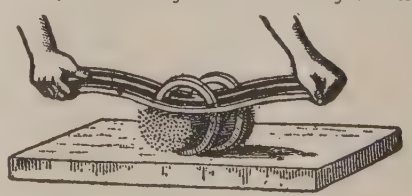


FIGURE *B*.

and grooved, and the head properly rounded. In the next step the needles are straightened by rolling in a mechanical appliance as shown in figure *B*, after which they are hardened, tempered, and polished. The polishing is effected by forming a bundle of needles and placing them in the scouring

machine, this device being adjusted so that by moving them under pressure backward and forward they assume a white and silvery appearance, after which they are polished. There are several stages in the polishing process, the first being effected with sand and emery, next with a coarse canvas, and the finishing polish is put on by means of a paste of putty powder. This process is merely one of many. In modern manufacture several hundred men are engaged in the different processes that a single needle undergoes. Ordinary needles for sewing are classed according to the relative fineness of their points as sharps, betweens, and blunts. The process of manufacture is so complicated that the labor involved possesses greater value than the material used, it being possible to make about 75,000 ordinary needles from five and a half pounds of wire.

NEEDLEGUN. See **Rifle.**

NEENAH (nē'nȧ), a city of Winnebago county, Wisconsin, on the Fox River. It is surrounded by a fertile agricultural country, has railroad facilities, and a number of important municipal improvements. There are manufactures of flour, stoves, paper, machinery, and farming implements. The city has a good system of public schools, and is the seat of a commercial college. Population, 1900, 5,954.

NEGAUNEE (nĕg-ȧ'nē), a city of Michigan, in Marquette county, about ten miles west of Marquette. It is located on a number of important railroads, and its site is on Iron Mountain, having an elevation of 900 feet above the surface of Lake Superior. The surrounding country is lumbering and iron-mining. It has a prosperous trade in cereals, fruits, and merchandise. Population, 1904, 6,797.

NEGRITOS (nĕ-grī'tōz), or **Negrillos,** a name of Spanish origin. It is now commonly applied to a Negro-like class of people inhabiting many of the islands southeast of Asia, and found especially in the interior of the Philippine Islands. There are a number of different tribes, of which the Aëtas, Ites Aigtas, Inaptas and Igolotes are the most numerous. These peoples are described as of exceedingly dark complexion, but not so black as that of the Negroes, with soft frizzled hair, small nose, lower part of the face projecting, and in stature quite small. The average height is about four feet eight inches. Large numbers of Negritos are still found in the interior of Luzon, Mindanao, Panay, Mindoro, and other islands. They support themselves chiefly by hunting and fruit culture. The language includes a number of different dialects.

NEGROES, the name now generally applied to the distinctly dark-colored varieties of mankind as opposed to the fair, yellow, brown, and red races. Originally the home of the Negro race was probably all of Africa south of the Sahara, India south of the Indo-Gangetic plains, Malaysia, and the greater part of Australasia. The regions included as their extensive seat of settlement were probably broken up at least to some extent by the sea in the Middle Tertiary times, and they also were influenced extensively by the constant spread and mixture of the Mongolians and Caucasians. It is quite certain that the subsidence of lands in the Middle Tertiary period caused a great division of the race by the sinking of a large area called Lemuria by writers, which is now flooded by the Indian Ocean. At present the pure Negroes are found mostly in a region extending across Africa from the Atlantic to the Indian Ocean, and between the southern portion of the Sahara Desert and the regions occupied by the Bushmen, Hottentots, and other allied classes that are not properly included with the Negroes.

Among the principal characteristics in which the Negroes differ from the Caucasians are that the brain weighs about thirty-five ounces instead of forty-five ounces, and their facial angle is 70° instead of 82°. In all classes the arm is abnormally long, sometimes reaching to the knee-pan, and the cranial sutures close much earlier than in other races. The color of the skin is black, the nose flat with dilated nostrils, the lips thick and protruding, and the cranium exceedingly thick. As a rule, the lower limbs are weak, the foot is flat with low instep, the hair woolly and black, the skin soft and almost hairless, and the frame of medium height. The mental differences between the Negro and Caucasian races are fully as marked as the physical distinctions, though many notable exceptions have been found. As a whole, the race is not as nervous as the whites. It has remarkable aptness for music, and distinctive ingenuity in forming mechanical devices. The race possesses a peaceable disposition, and is remarkably receptive and imitative. It is noteworthy that Negroes are able to flourish in hot climates possessing elements entirely fatal to higher races, but they are less able to withstand severe cold. In civilized arts the typical Negroes of Africa have been influenced to a greater extent by Mohammedans than by any other class of people, and exhibit more marked traits of Mohammedan civilization and customs than of any other class. The entire Negro population of the world is estimated at 160,000,000, of which about 25,000,000 are mongrels.

The Negroes in their native condition have various industries that they practice for procuring means of subsistence, though some of the classes are given to savagery, stupidity, and indolence. Those somewhat developed in civilized arts construct dwellings of stone and wood, work in metals, and manufacture fabrics, leather products, household utensils, and weapons for defense and the chase. In some regions agriculture is pursued successfully, live-stock is reared, and commercial enterprises are developed. In the manufac-

ture of musical instruments they display marked skill, largely because of their great fondness for music, and in their towns many mosques and other buildings of note are maintained. The whole race has been subjected extensively from an early date to impressment into slavery by other races more highly developed.

The modern institution of Negro slavery dates from 1503, when the Portuguese began to carry large numbers to the West Indies, and in 1511 the slave traffic was formally sanctioned by Ferdinand of Aragon. Negroes were first brought as slaves to the United States in 1620, and Queen Elizabeth legalized slavery and the slave trade both in England and in the colonies. The congress of the United States prohibited the slave traffic in 1794, when importation to the United States ceased, but importation to the West Indies and Brazil continued until 1840. The Negroes imported to the United States were mostly of the typical class from the African interior, but those taken to South America and the West Indies consisted largely of Zulus, Kaffirs, and Hottentots. In many regions the higher classes of Negroes made it a business to pursue and capture large numbers of neighboring clans, which they did to sell the captives into slavery. The practice finally developed into such moral degradation that the traffic was broken up entirely by the more civilized European peoples. Many of the Negroes in the United States have made remarkable advancement in the arts, sciences, and industries since their liberation from slavery on Jan. 1, 1863. They have not only taken their place as American citizens, but have gone into the schools, churches, industries, and positions of honor, and everywhere exhibit remarkable endurance and moral and mental aptitude. The Negro population of the United States in 1790 was 757,000; in 1860, 4,442,000; in 1890, 7,488,788; and in 1900, 8,840,789. Of the entire population of the United States, 11.6 per cent are Negroes. The excess of females is 54,347.

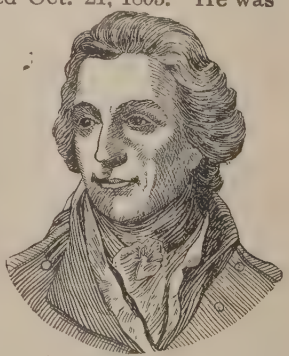
NEGROS (nā'grōs), one of the Philippine Islands, situated south of Panay, and separated from Cebu by Tanon Strait. A range of mountains extends nearly the entire length from north to south, but the coast regions are quite fertile. The productions consist of lumber, sugar, tobacco, sisal, and tropical fruits. Horses, cattle, swine, and cariboos are reared in abundance. The island has an area of 3,790 square miles, and a population of 240,000. Most of the natives speak the Visaya language. Among the towns are Bacolod, Bajo, Dumaguete, and Bacong.

NEHEMIAH (nē-hē-mī'ah), a distinguished Israelite, the son of Hakaliah. He is mentioned in the Bible as cup-bearer to Artaxerxes Longimanus, king of Persia. In 444 B. C. he was sent as governor to Judah, where he rebuilt the city of Jerusalem, restored the walls and gates, and made it possible for the Levites to return from their banishment. It was difficult to restore prosperity, partly because the scattering of the Jewish people had caused them to fall into poverty, but chiefly for the reason that local dissensions were common. However, after heroic perseverance he restored the observance of the Sabbath and rebuilt and cleansed the temple. He also prohibited inter-marrying with Gentiles, and inaugurated civic reforms. The works of Nehemiah are recorded in the book that bears his name, which is partly ascribed to him and partly to others who compiled facts relating to the closing years of Nehemiah's life. The book was originally a part of Ezra, but later it was given its present independent position.

NEILL (neel), **Edward Duffield**, educator and author, born in Philadelphia, Penn., Aug. 9, 1823; died in 1893. He graduated at Amherst College in 1842, and, after studying theology at Andover, entered the ministry. Subsequently he settled in the state of Minnesota, where he was superintendent of schools in 1858-61, chancellor of the state university from 1873 to 1883, and in the latter year became president of Macalester College, Minneapolis. His work as superintendent of public instruction was highly efficient, and he gave to literature many excellent productions, among them "Concise History of Minnesota;" "English Colonization of America in the 17th Century;" "Threads of Maryland Colonial History," and "Annals of the Minnesota Historical Society."

NELSON, an important river of Canada. Its source is in Lake Winnipeg, and after a course of 425 miles toward the northeast it flows into Hudson Bay. Navigation extends a distance of 125 miles, but by effecting projected improvements at its numerous rapids, which now retard navigation, its importance as a commercial avenue may be greatly facilitated.

NELSON, Horatio, Viscount, noted admiral, born at Burnham Thorpe, England, Sept. 29, 1758; died Oct. 21, 1805. He was the son of Edmund Nelson, entered the royal navy at the age of twelve years as midshipman, and in 1773 accompanied the Arctic exploring expedition under Commodore Phipps. His industry and aptitude caused him to be promoted lieutenant in 1777, two years later he became post captain, and shortly after secured command of a frigate in the Leeward Islands. In 1793 he became commander of the Agamemnon,



HORATIO NELSON.

a vessel with sixty-four guns, and at once sailed for Corsica, where he aided in the sieges of Bastia and Calvi. On Feb. 14, 1797, he displayed marked efficiency at the battle of Cape St. Vincent, which was followed by a promotion to the rank of rear-admiral, and the following year he obtained a famous victory over the French in the battle of the Nile. This success caused him to be granted the title of Baron Nelson of the Nile and an annual pension of $10,000. Shortly after he succeeded in expelling the French from Naples, and was awarded an estate valued at $15,000 a year by the king of Naples, and received the dukedom of Bronte. His next success was achieved in 1801, when he struggled with much bravery against the Danish fleet at Copenhagen, and by his masterful ability succeeded in shattering the naval forces of Denmark, which had long threatened the rise of English naval power.

When war broke out anew against France and Spain, Nelson was given command of the naval forces in the Mediterranean, where he successfully blockaded Toulon for several years. On March 30, 1805, the French fleet effected its escape from the blockade, and was soon after joined by the Spanish squadron that had been located at Cadiz. The two now sailed across the Atlantic to the West Indies, where Nelson pursued them, and to evade battle they hastened back to Europe, taking a position at the Spanish batteries at Cadiz. The Spanish fleet was commanded by Gravina and the French by Villeneuve. On October 19 they ventured from their position at Cadiz, and on the morning of October 21 a decisive battle took place off Cape Trafalgar, in which the English fleet won a decisive victory. However, Nelson was wounded by a musket-ball and died amid the most celebrated victory of his life. Nelson is described as a sailor of great foresight, intuitive decision, and promptness in carrying forward his designs. The remains were taken to England and buried in St. Paul's Cathedral, where a beautiful monument has been erected to his memory.

NELSON, William, soldier, born in Maysville, Kentucky, in 1825; slain Sept. 29, 1862. In 1840 he became a member of the United States navy, and soon after attained to the rank of master. He had charge of the gunboats on the Ohio River in 1861, but was made brigadier-general of volunteers, and assigned to a command in Buell's army. In 1862 he became major-general of volunteers. His death occurred at a hotel in Louisville, where he was shot by General Jefferson C. Davis as the result of a personal quarrel.

NELUMBIUM (nē-lŭm'bĭ-ŭm), a genus of plants common to the fresh waters of temperate zones, which includes many species remarkable for their beautiful flowers. It is thought that this genus includes the Egyptian lotus, a plant once common in the Nile region, but it is not abundant there at present. However, it is found extensively in India, China, the Malay Archipelago, and Australasia, where it grows vigorously in the fresh waters. The leaves contain medical properties serviceable for fever patients, while the seeds are eaten by the Hindus. The plant is considered sacred in many Asiatic countries, where it is used in religious rites, and the fibers derived from the stalk serve as a wick for lamps in Hindu temples. A variety of nelumbium found in the southern part of the United States produces rhizomes, from which tuberous roots develop that resemble the sweet potato. These tubers are favorite food products, especially among the Indians.

NEMESIS (nĕm'ē-sĭs), a Grecian divinity, represented by Hesiod as the daughter of Night, and as the power that adjusts human affairs by awarding to each individual the fate which his actions deserve. She is not mentioned by Homer, which is evidence that she was a conception of later times, when higher views of morality had obtained a foothold among the Greeks. In statuary she is represented as a beautiful woman of thoughtful and benign aspect and regal bearing. Her majestic brow is crowned with a diadem, which is taken as a fitting emblem of the manner of guiding, weighing, and measuring all human events. The Romans worshiped her as a divinity who possessed the power of averting the pernicious consequences of envy. In the ancient African city of Rhamnus a famous temple was constructed to Nemesis. It contained a celebrated statue of this goddess by Phidias, the remains of which were discovered quite recently.

NEPAL (nā-päl'), or **Nipal,** an independent kingdom of Asia, situated north of British India and south of Thibet. It occupies the southern range of the Himalayas for a distance of about 500 miles, has an area of 54,000 square miles, and a population of 2,125,000. The mineral products include marble, jasper, copper, iron, sulphur, and rock crystal. Fine forests of oak, pine, sal, mimosa, and spruce abound in the lower slopes of the mountains. Its numerous valleys are noted for their fertility; in them large quantities of rice, oil, seeds, fruits, opium, and other products abound. The manufactures embrace cotton and woolen goods, bell metal, ironware, copper products, brass vessels, clothing, and utensils. Cattle, buffaloes, horses, sheep, and swine are reared in abundance. The export and import trade with British India and Thibet is extensive, and there are numerous trade routes penetrating through all the principal valleys. Nepal was occupied in the 14th century by the Hindus, but they were expelled in 1667 by a class of Mongolians. The religion is Buddhism. Khatmandu is the capital and residence of the reigning sovereign.

NEPOMUK, St. John of, the patron saint of Bohemia, born near Pomuk, about 1330; suffered martyrdom in March, 1383. He secured a liberal education at the University of Prague, was ordained a priest, and served in that capacity in the diocese of Prague. In 1380 he was rector of the Church of St. Gall, and in 1381 became doctor of canon law. Later he secured an appointment as confessor to Sofia, wife of King Wenceslaus IV., and, being thought implicated with Archbishop John of Ganstein in his disputes with the king, he was cruelly tortured and drowned in the Moldau River. Pope Benedict XIII. canonized him in 1729. May 16 is the day on which his memory is commemorated with appropriate exercises.

NEPTUNE (nĕp'tūn), the Roman god of the sea, who corresponded to the Greek divinity Poseidon. The Roman commanders invoked the favor of Neptune by sacrifices before venturing upon naval expeditions, his influence being held essential against both stormy seas and hostile armies. His temple at Rome was in the Campus Martius, and the festivals held in his honor were called Neptunalia. He is represented in art holding a three-pronged spear, or trident, in his hand, and his symbols are the horse and the dolphin. Artists portrayed him either in a state of calm or in agitation, corresponding to the aspect of the sea over which he presided.

NEPTUNE, a planet of our solar system, the most distant from the sun yet discovered, being 2,750,000,000 miles from that illuminary. It is invisible to the naked eye, and appears in the telescope as a star of the eighth magnitude. Its distance from the earth is estimated at 2,630,000,000 miles. The diameter is about 36,750 miles; the inclination of its axis to the plane of the ecliptic is 1° 0′ 7″, and its year is 164.7 terrestrial years. The velocity with which it moves is estimated at only 12,000 miles per hour. Its density is a little less than that of water. Estimates place the light and heat received by it from the sun at about one-thousandth that received by the earth. Neptune has one satellite. This satellite has a mean distance of 235,000 miles from the planet, and revolves around it in a period of 5 d. 21 hr. 2 min. 40 sec. Leverrier discovered Neptune on Sept. 20. 1846, but it had been suspected for many years that such a planet exists, from the fact that Uranus gives evidence by its perturbations of the existence of such a body.

NERBUDDA (nĕr-bŭd'ą), or **Narbada**, a large river of India, rises in the central plateau of that country, and after a course of 800 miles toward the west flows into the Gulf of Cambay. The Nerbudda valley is fertile, producing cereals, fruits, and vegetables in abundance. On its banks are the cities of Jabalpur, Burwani, and Barneh. It is navigable for ships of large size for a distance of fifty miles. The Hindus regard it sacred.

NERO, Lucius Dominitus, Roman emperor, son of Cneius Domitius Ahenobarbus and Agrippina, daughter of Germanicus, born at Antium, Dec. 15, 37 A. D.; suicided June 9, 68 A. D. His mother married Emperor Claudius, who adopted him, when his name was changed to Nero Claudius Cæsar Drusus Germanicus. Subsequently Nero married Octavia, daughter of Emperor Claudius. The emperor abandoned Nero's mother, but the latter succeeded in removing him by poison, and in 54 Nero was confirmed as emperor by the senate and the provinces. Brittanicus, son of Claudius, was the rightful heir to the Roman throne, but Nero had him removed in the year 55 by poison, when the youth was fourteen years of age. This course he sought to justify by charging that he might become a dangerous rival. His mother at first exercised marked influence over his administration, but in 59 he caused her to be assassinated to please Poppæa Sabina, and, after divorcing and murdering his wife, married her. While his private life was a disgrace from the first, public affairs were conducted with considerable vigor under the assistance of Seneca and Burhuss, but in 64 a large part of Rome was destroyed by fire. This catastrophe destroyed two-thirds of the great city, and many writers have attributed the loss to Nero himself, but that sovereign charged the destruction to Christians and caused many of them to be tortured and killed.

NERO.

Immediately after the burning of Rome Nero began to rebuild the city, devising for that purpose a vast system of public taxation. He caused the construction of a magnificent palace on Palatine Hill, which, from its beautiful ornamentation in gold, became known as the Golden House. In 65 a conspiracy was formed against him, but it was discovered before being carried out, and ended in the execution of Seneca and the poet Lucan. Shortly after he murdered his wife, Poppæa, put Antonia, daughter of Claudius, to death for refusing to marry him, and subsequently married Statilia Messalina, after causing the death of her husband. Nero had many accomplishments as a philosopher, poet, musician, and charioteer. By his skill in charioteering he gained applause in Italy, Greece, and the Spanish countries. The Gaelic and Spanish regions undertook to dispossess him in 68, and in the same year Galba caused the Prætorian guards to declare in his favor and against Nero. The senate at once declared Nero an enemy to

his country, and, to escape arrest, he committed suicide by stabbing himself, being at that time thirty-one years of age and having reigned fourteen years. A revolt broke out soon after in Judæa, which was suppressed by Vespasian and ended in the conquest of Jerusalem.

NERVES, the cord-like structures composed of delicate filaments by which sensation or stimulative impulses are transmitted to and from the brain and other organs. In the animals belonging to the higher scale of life the nerves proceed from the brain and spinal cord, and in lower animals they issue from the central ganglia. The simplest nerve system is found in the mollusca, and in the radiata nerves are arranged in a circle around the mouth, from which they communicate with the ganglia situated at the base of each ray. Insects possess nerve structure capable of producing sensory, reflex, and motor action, and as the scale of animal life rises there is a marked increase in the resemblance of nerves to those found in man, where their highest development and greatest sensitiveness are observed.

The nerves common to the human system are hard, silvery threads, composed of gray matter within and white matter without. They ramify all parts of the body, and, though often noticed very near each other, they are perfectly distinct and each conveys its own impression. The nerves carrying impressions to the brain are called sensory nerves, while those conveying orders of the mind to the different organs are designated motory nerves. If the motory nerves leading to a particular portion of the body be cut, all motion is destroyed, though sensation remains; and if the sensory nerves be cut, feeling is lost, but motion remains. The nervous system is made up of nerve cells, nerve fibers, and nerve end-organs. Nerve cells form the essential part of the brain and spinal cord, and from them as a center the nerve fibers run as fine threads to the cells of the body. The outer ends of the cells touching a company of cells, or nerve end-organs, carry impressions to the central nerve cells. Although each cell in the body

SECTION OF THE SPINAL CORD WITH NERVES.

acts independently of the rest, yet the central nerve cells call all into active harmony. There are three general classes of nerves, which are designated as spinal, cranial, and sympathetic.

The nerves that go to different organs run together in a bundle, which divides into its separate threads upon reaching its destined place. Each nerve thread is composed of a central fiber surrounded by a protected layer of tissue, and they vary in size according to the organ in which they have their seat. There are thirty-one pairs of spinal nerves, which issue from the spinal cord through apertures provided for them in the backbone. Each of these nerves has two roots;

THE BRAIN

and the origin of the twelve pairs of Cranial Nerves. *F, E*, the cerebrum; *D*, the cerebellum, showing the arbor-vitæ; *G*, the eye; *H*, the medulla oblongata; *A*, the spinal cord; *C* and *B*, the first two pairs of spinal nerves.

the posterior is the sensory and the anterior the motory one. Animals lose motion when the anterior root is cut, and the power of feeling when the posterior root is severed. The cranial nerves consist of twelve pairs, which spring from the medulla oblongata and the lower part of the brain, and are shown in the accompanying illustration. The pair of olfactory nerves (1) are the nerves of smell; the pair of optic nerves (2) are the nerves of vision, and three pairs of motores oculi nerves (3, 4, and 6) serve to move the eyes. The pair of tri-facial nerves (5), so named from its three branches, is the pair that controls the upper part of the face, the upper jaw and teeth, and branches into the lower jaw and mouth to form the nerve of taste, where it is known as the gustatory nerve. Expression is given to the face by the facial pair (7); the auditory pair (8) forms the nerves of hearing; the glossopharyngeal pair (9) connects with the membrane of the pharynx; the pneumogastric pair (10) presides over the stomach, lungs, larynx, liver, and heart; the accessory pair (11) regulates the vocal movements of the larynx; and the hypoglossal pair (12) gives motion to the tongue. The nervous system is strengthened by healthful exercise and restful sleep. Nervous diseases result from inflammation of nerve substance, from general bad health, from intemperance, and from changes due to accidental injury of nerve fibers, cells, or centers.

NEST, a habitation or abode constructed by birds for incubating their eggs and rearing their young. Nests are of various construction and are greatly diversified in situ-

GOLDFINCH'S NEST.

ation. Some birds, as the auks and stone-curlew, do not construct nests, while some reptiles and mammals do, among them foxes, moles, weasels, rabbits, squirrels, mice, and many others. This is true also of many insects and crustaceans. A class of swallows build the famous edible nests, which are abundant principally in China and the islands southeast of Asia. These nests are formed of small leaves, grasses, and fibers, and are fastened to rocks by a substance that exudes from the salivary glands under the tongue. This substance is gelatinous and is the portion eaten. These nests are gathered by means of ladders, and the edible

ORIOLE'S NEST.

portions sell at from $1 to $35 per pound, depending upon the quality. It is estimated that fully 8,500,000 nests are gathered annually. The product is used chiefly by the wealthy for thickening soups.

NESTOR (nĕs'tŏr), a Greek hero mentioned in ancient legends. He was the son of Neleus and Chloris. His birthplace probably was in Messenian Pylos, and it is recounted that he married Eurydice. He is noted as a valiant warrior against the Arcadians and Centaurs, and served as the counselor of the Grecian chiefs in the Trojan War. After the fall of Troy, he returned to Pylos, where he ruled over the people until his death.

NESTORIANS (nĕs-tō'rĭ-ănz), a sect of Christians organized in western Asia, so named from Nestorius, their founder. The first organization was formed about the middle of the 5th century, but the sect was repressed by the Romans. Persia gave protection to the organization, and its creed was established by King Pherozes as the national faith. The fundamental doctrine was declared by a synod at Seleucia, where a resident patriarch was located. By the 12th century it had grown to an important community of ninety bishops, with a considerable number of communicants in Syria, Palestine, and Arabia. A division occurred in the 16th century, when many members began to call themselves Chaldæan Christians and allied themselves with the Roman Catholic Church. At present their principal seat of influence is in Kurdistan, but there are branches in India and other portions of Eurasia. The membership formerly was made up of a destinctively studious class of people, but during the ravages of Tamerlane they suffered materially, and in 1843 many of them fell as victims of persecutions by the Turks. A majority of the Nestorians are illiterate and poverty-stricken, but they maintain several excellent institutions of learning and have many clergymen of eminent ability.

NETHERLANDS (nĕth'ẹr-lạndz), or **Holland**, a kingdom of Europe, bounded on the east by Germany, south by Belgium, and west and north by the North Sea. Its area is 12,648 square miles, and it has a population of 5,480,680, or more than 400 per square mile. It consists of eleven provinces and the grand duchy of Luxemburg, the provinces being North Brabant, Guelderland, South Holland, North Holland, Zealand, Utrecht, Friesland, Overijssel, Groningen, Drenthe, and Limburg. The colonial possessions include an area of 738,000 square miles, and an estimated population of 34,500,000. Among the chief possessions are Sumatra, Java, Madura, Banka, part of Borneo, part of New Guinea, the Timor Archipelago, the Moluccas, Celebes, Menado, Billiton, Bali, Lombok, and Dutch Guiana.

The Netherlands form the lowest part of the great plain of northwestern Europe, hence the name. The natural drainage is inadequate to allow cultivation in all parts of the country, but a vast system of canals and dikes has been built to render cultivation of the soil possible. In some parts the surface is from ten to twenty feet below sea-level, but these parts are protected from overflows by great embankments, while the water is pumped constantly from some distance below the surface by means of windmills. By this ingenious method it has

been possible to transform marshes and lakes into the most fertile and productive regions of Europe, and the land surface has also been enlarged by pushing extensive enterprises for reclaiming large surfaces formerly covered by the North Sea. The coast line of the Netherlands is exceedingly irregular, but the only inlet of considerable extent is the Zuyder Zee. There are many fertile islands near the coast, all of which have been improved more or less by cultivation and the construction of embankments. The more elevated portions average about 150 feet above sea-level, though in the southeast there are elevations fully 680 feet high. This once uninteresting and marshy region of Europe has been converted into a land of almost inexhaustible fertility, containing the richest alluvial deposits utilized in cultivation. The rivers of the Netherlands are the Scheldt Ijessel, Maas,

WINDMILLS IN THE NETHERLANDS.

and Rhine, though the last named is by far the most important. These rivers have a number of tributaries, and have been improved by a remarkable and extensive system of canals. Many of the canals are of double value, serving for commercial communication and for drainage purposes, and in many cases elevated embankments protect the adjoining regions from overflows. The climate is very similar to that of England, though it is more humid in the summer season.

The principal productions of Holland, so far as they relate to the soil, are wheat, rye, oats, potatoes, beet-roots, tobacco, and vegetables. It fisheries are important, the principal output including anchovies, herring, salmon, oysters, and many deep-sea varieties. The manufactures embrace vast quantities of beet sugar, vinegar, steam engines, spirituous liquors, and earthenware, and there are also considerable productions of woolens, cotton and silk goods, glass, paper, leather, dairy products, velvets, musical instruments, and toys. Among the domestic animals are fine grades of milk cows, other cattle, goats, horses, swine, and poultry. The export and import trade is very extensive, the former averaging $675,000,000, and the latter $598,500,000. Fully fifty per cent. of the foreign trade is with Germany, twenty-one per cent. with Great Britain, and twelve per cent. with Belgium. Interior commercial enterprises are facilitated by numerous railroads and canals, the latter making transportation extremely cheap, while the foreign trade is by extensive steamer lines to all parts of the world. The lines of railroads aggregate 2,150 miles, and the canals furnish 5,525 miles of waterways.

The Reformed Lutheran Church is the religion of the royal family and of most of the population, but entire religious liberty is granted to all. Among the principal denominations, aside from the one already named, are the Jewish, the Roman Catholic, and the Jansenist. A splendid public school system is maintained, by which not only elementary instruction is provided, but there are articulated high schools, colleges, and four celebrated universities at Amsterdam, Leyden, Utrecht, and Groningen. School attendance is compulsory, and the per cent. of illiteracy is remarkably low, only about three per cent. being unable to read or write. In the higher institutions classical studies are pursued, as well as courses in medicine, law, music, sciences, navigation, agriculture, horticulture, dairying, and various other industrial arts. The war footing is 85,000 men, and the peace footing 27,500 men. There is a considerable navy, which includes six armored vessels, twelve protected cruisers, six monitors, fifteen gunboats, and twenty-two torpedo boats. The government is a constitutional monarchy, with the executive authority vested in a king or queen. Legislative authority is vested in a parliament of two chambers, and the judicial in a national supreme and subordinate courts. The right of suffrage is restricted to male citizens twenty-three years of age, paying at least ten guilders of tax. The guilder is the monetary unit, which is equivalent to forty-two cents of American money.

The official and literary language of the Netherlands is generally called Dutch, but by the people themselves it is known as Nederduitsch, a term used to distinguish it from the language of Germany, known as Hochdeutsch. The former is called Low Dutch and the latter High Dutch by some writers, though Hollandisch and German are the proper names, since Low Dutch applies more particularly to a peculiar dialect spoken by the people resident in Holstein and other adjacent provinces. Flemish is quite similar to the Dutch, and both origi-

nated from the Germanic family of Indo-European languages. The distinctly Dutch literature dates from the latter part of the 16th century, when the language was systematized and polished by such eminent writers as Spiegel, Coornhert, Van Marnix, and others. Pieter Hooft (1581-1647) gave a marked impetus to prose writing, and also produced several excellent dramas and poems. Joost van den Vondel (1587-1679) is noted as one of the most celebrated dramatists, giving to the Netherlands poetic productions that still take high rank. His contemporary, Jacob Cats (1577-1660), was a noted writer of maxims, and his works are reckoned among the classics. Constantyn Huygens is one of the noted epigramists and satirists of Holland; Dirk Kampuhisen a hymn writer; Brandt a celebrated historian, and Oudaan a political writer. The spread of French in the 17th century caused a temporary decline in Dutch literature, but Jacob Bellamy, in 1775, began its revival. Among the writers of the early part of the 19th century are the celebrated Bilderdijk, Helmers, and Tollens. The last named is the author of "Wintering of Hollanders in Nova-Zembla," an excellent descriptive poem, while Van Lennep is celebrated as a novelist. Other prominent writers of the Netherlands were Erasmus, Grotius, Boerhaave, Spinoza, Gronovius, and Lipsius.

The history of the Netherlands begins about the year 150 B. C., when that region was occupied by the Frisians. At the beginning of the Christian era it belonged partly to Belgium and partly to Germany. The Romans conquered it in their western invasions, and in the early part of the 5th century A. D. it was conquered by the Franks. Charlemagne came into possession of the entire region in the 8th century, and in the 11th century most of the territory comprised independent duchies. In the 15th century it was acquired by the Austrian house of Hapsburg. Soon after it became a possession of Spain, and, when Charles V. abdicated in 1556, Philip of Spain became the ruling sovereign. Religious persecutions caused Zealand and Holland to rebel in 1576, and three years later the provinces of Guelders, Zealand, Holland, Friesland, and Utrecht concluded the treaty of Utrecht, by which they repudiated Spanish dominion, and William of Orange became the governor. This sovereign was assassinated July 10, 1584, but he was succeeded by other efficient leaders, and Holland remained a powerful country until 1713, being in that period the most important commercial and maritime nation of the world.

The decline of the Netherlands as a world power may be ascribed to the rise of Spain and other nations that preyed upon it through a series of wars. Not only was it a powerful nation in trade and colonization, but in the development of interior resources. It was in the dominion of the Netherlands that the pendulum clock, the first optical instruments, printing, and many other useful arts and devices were invented or first utilized. The armies of France made incursions through portions of the Netherlands in 1794 and several succeeding years. Louis Napoleon became its king in 1806, and in 1810 it was formally annexed to France. The Orange family was recalled in 1814, at the downfall of Napoleon, and the provinces of Belgium and Holland were formed into the kingdom of the Netherlands. This union remained intact until 1830, when Belgium seceded to form a separate kingdom. An attempt to restore the union by King William I. was prevented by the intervention of the great powers, and in 1839 the governments of the separate countries were recognized practically as they exist at present. In 1840 the king abdicated, but he was immediately succeeded by his son as William II., and at his death in 1849 William III., his son, was crowned. That sovereign died on Nov. 23, 1890, and his daughter, Wilhelmina, became queen. The Hague is the capital of Holland. Other cities of importance include Amsterdam, Rotterdam, Groningen, Arnhem, Haarlem, Utrecht, Leyden, and Maestricht. The country has been unusually prosperous the past fifty years, showing remarkable growth in intelligence, industrial development, and wealth.

NETTLE, a genus of plants widely distributed, embracing species varying in size from small plants to large shrubs. Most of the species have alternate or opposite leaves, are of herbaceous structure, and many are covered with sharp tubular hairs. The hairs contain an acrid fluid, which, when pressed by the exposed hand, is injected into the flesh and causes a painful wound. The flowers of most varieties are inconspicuous. They are unisexual, the male and female blossoms growing on the same or separate plants. Nettles serve a useful purpose in that their seeds are nutritious. The leaves are employed to make a beverage, and the stalks supply fibers of value in making cloth and yarn. The Chinese manufacture grass cloth from several species of the plant. Thread is spun from the product of several varieties in a number of European countries, and the tender shoots of young plants are used for preparing broth and porridge. Many species of nettles are common to the United States, but they are widely distributed in all the continents and principal islands. Nettle-rash is a disease of the skin quite similar to the result from nettle stings, but it is caused principally by indigestion. The nettle-tree is a deciduous plant native to North America, Eurasia, and many other regions. It attains a height of twenty-five to 140 feet. Its wood is of value in manufacturing.

NEUCHATEL (neu-shä-tĕl'), or **Neuenburg**, a city of Switzerland, capital of a province of the same name. It is situated on the northern shore of Lake Neuchatel.

The city has a beautiful location, is conveniently connected by railroads, and contains a number of excellent scientific and educational institutions. There are manufactures of cotton and woolen goods, jewelry, clocks, and machinery. Population, 17,245.

NEUCHATEL, Lake of, a fine body of water in Switzerland, about twenty miles west of Berne. It has an elevation of 1,425 feet above sea-level, and covers an area of ninety-one square miles. The valley surrounding the lake is highly fertile, and is traversed by a number of important railroad lines. Near it are the cities of Neuchatel and Yverdon. The scenery attracts many tourists. Remains of lake dwellings have been discovered in it and in the small lake of Bienne, a short distance to the northeast. The lake receives the waters from the Reuse and the Thiele rivers. Its outlet is through Lake Bienne and the Aar River into the Rhine.

NEURALGIA (nū-răl'jĭ-à), a disease resulting chiefly from overwork, debility, and general depression. It is produced directly by irritation of the tri-facial nerves, or by sympathetic action with inflammation of the surrounding parts of various nerves. Neuralgia affecting the head is called tic-douloureux, in the chest wall intercostal, and in the breast angina pectoris. The disease varies greatly in duration and degree, but it is most common to persons of thin blood. It often follows exposure to cold and wet, excessive indulgence in alcoholic drinks, or a wound or bruise. Neuralgia frequently accompanies rheumatism, and results from sudden mental emotions. Generally it is a very painful disease and in many cases becomes chronic. Relief is obtained by an inhalation of chloroform. The treatment is generally of a tonic nature, involving the use of such remedies as quinine, bromide of potassium, and arsenic, though these should be given only under competent medical advice.

NEUVILLE (nû-vĕl'), **Alphonse Marie de**, noted artist, born in St. Omer, France, May 31, 1836; died in Paris, May 20, 1885. He was a student of Delacroix, and developed a reputation as painter of battle scenes in the Crimean War. Later he accompanied the army to paint various scenes in the wars with Italy and Mexico and the Franco-German War. In the war with Germany he also fought in the ranks as a soldier to learn regarding military life from actual experience, of which fact he took advantage in painting various notable incidents observed in celebrated engagements. Subsequently he prepared many illustrations for various books. The most notable of these were designed for Guizot's "History of France."

NEVA (nā'vä), a river of Russia, having its source in the southwest corner of Lake Ladoga. It forms the outlet for that lake and Onega, Ilmen, and several others. In its course of forty miles it passes through St. Petersburg and flows into the Gulf of Finland. An extensive system of canals enhances its commercial importance, facilitating water connection with many trade centers of Russia.

NEVADA (nę-vä'dą), a western state of the United States, bounded on the north by Oregon and Idaho, on the east by Utah and Arizona, and on the south and west by California. It is about 500 miles from north to south, 300 miles from east to west, and contains an area of 110,700 square miles, about the size of Florida and North Carolina. The state includes a large part of the great basin between the Sierra Nevada and Wasatch mountains, a region once an inland sea, and its surface is traversed by numerous mountain chains. Its average altitude is 4,000 feet above sea-level. Many of the ranges run parallel to each other in a north and south direction. The principal chains include the Grant, Pancake, Belted, Monitor, Meadow Valley, Egan, Diamond, Schell Creek, Trinity, Walker River, and Quinn River ranges, and the Hot Springs, Augusta, Shoshone, and Monte Cristo mountains. Valleys of more or less importance separate the different ranges and mountains, some of which are fertile, while others are rocky and barren.

The drainage of Nevada is partly by the Columbia River system and partly by the Colorado, but much of the interior has no outlet to the sea. The northern part is drained by the Quinn and Owyhee into the Columbia, and the southern portion by the Muddy and Virgin rivers into the Colorado. Its interior drainage is by the Humboldt into Humboldt Lake, by the Walker into Walker Lake, by the Carson into Carson Lake, and by the Reese, a river that disappears in the sand and gravel. The climate is arid and healthful. In the southern part the annual rainfall is about six inches and in the northern part fifteen inches, but the amount falling depends somewhat upon the proximity of mountains to the valleys. The mean annual temperature is 52°, but this varies greatly with the altitude. Evidences remain of the existence of abundant vegetation in early periods and the existence of vast lakes, but at present the flora is limited, and irrigation is necessary for the production of crops. Many species of cactus, bunch grasses, sage brush, and other forms common to arid climates are abundant, and in some of the mountains various species of evergreen trees are found, principally cedar.

Much of the surface of Nevada possesses fertile soil. Large tracts are utilized profitably under a system of irrigation, and in many regions the mountain slopes supply without irrigation some of the most excellent pasturage in America. Among the principal crops are barley, oats, wheat, vegetables, and fruits. The live-stock includes horses, cattle, swine, and sheep, the cattle

product being the most valuable and extensive. Nevada is noted for its extensive mining interests, the principal products being silver, iron ore, gold, borax, magnesia, soda, sulphur, arsenic, slate, and granite. Mineral springs are abundant, yielding large quantities of various mineral substances, and it has a large number of noted thermal springs. The manufactures embrace products used in connection with the reduction and smelting of ores, chemicals, utensils, and machinery. The railroad lines aggregate 1,150 miles.

Nevada gives adequate support to a general system of public instruction, there being common and high schools, and the state university at Reno. Charitable, reformatory, and penal institutions are maintained under state taxation. The various religious organizations are well represented, including principally Latter Day Saints, Roman Catholics, Methodists, Episcopalians, and Presbyterians. There are thirty-five periodicals, of which twelve are dailies and twenty-two weeklies.

The region included in Nevada was obtained by the Mexican cession of 1848, and in the same year several settlements were formed by Mormons. Silver was discovered in 1859, and in 1861 Nevada was separated from Utah and organized as a territory. It was admitted as a state in 1864, and since then has been popularly known as the Sage Brush State. There are fourteen counties. Carson City is the capital. Other cities include Virginia City, Reno, Eureka, and Gold Hill. Population, 1900, 42,335. The total colored population is 6,930, or 16.4 per cent. Of this number 134 are Negroes, 228 Japanese, 1,352 Chinese, and 5,216 Indians. The male population is 60.5 per cent.

NEVADA, county seat of Vernon county, Missouri, located eighty-six miles south of Kansas City. The city is surrounded by a rich agricultural country, and in its vicinity are valuable deposits of coal. It is connected by several important railroads, giving it considerable trade advantages. Among the manufactures are carriages, flour, lumber products, galvanized iron, and machinery. The general facilities include a public library, electric lighting, pavements, a public park, and a fine system of schools. It is the seat of Cottery College, Christian College, and the state asylum for insane. Population, 1900, 7,461.

NEW ALBANY, a commercial and manufacturing city of Indiana, in Floyd county, on the Ohio River, opposite Louisville. It is finely situated, has well improved streets and several public buildings, including a courthouse, an opera house, many fine churches, and several public halls. Its electric street railway system extends to a number of suburbs. Several railroad lines center there, giving it convenient connections with trade emporiums both north and south. The manufactures include cotton and woolen goods, cigars, steamboats, packed meats, flour, glass, stoves, hardware, edged tools, engines, and machinery. It is the seat of excellent public schools and has a fine public library. Its river and railroad trade is extensive. New Albany was incorporated as a city in 1839. Population, 1900, 20,648.

NEWARK (nū'ark), a city in Ohio, county seat of Licking county, on the Ohio and Erie Canal and the Licking River. It has important railroad connections, and is surrounded by a fertile agricultural country. There are electric lights and street railways, pavements, waterworks, sewerage, and a number of fine schools. Its manufactures include railway cars, clothing, stoves, glass, engines, ironware, machinery, vehicles, and paper. Extensive coal works are in its vicinity. It has a growing trade in farm produce, wool, and live-stock. Population, 1900, 18,157.

NEWARK, an important manufacturing city of New Jersey, county seat of Essex county, on the Passaic River, eight miles west of New York City. Its extensive trade is facilitated by a number of principal railroad lines centering there, and it also has navigation facilities through improvements made on the Passaic River. It is handsomely located, has a number of public parks, well paved streets, electric and gas lighting, and a fine system of electric railways. In the city are about 2,500 manufacturing establishments, which represent a capital of $65,500,000 and employ on an average 50,000 persons. The city has about 115 churches, four hospitals, an insane asylum, an orphan asylum, and other charitable and benevolent institutions. It also has a large number of splendid schools, colleges for academic instruction, educational and scientific societies, and many periodicals. The principal manufactures are machinery, cotton and woolen goods, thread, carriages, tobacco products, sewing machines, furniture, chemicals, spirituous liquors, boots and shoes, trunks and valises, leatherware, hardware, and clothing. The city dates from 1666, when a company of thirty Puritans formed a settlement on its site. It ranks as the sixteenth city of the United States. Population, 1900, 246,070.

NEW BEDFORD, an important city of Massachusetts, county seat of Bristol county, on the estuary of the Acushnet River, fifty-six miles south of Boston. New Bedford has an excellent harbor that opens on Buzzards Bay, is conveniently connected by steamboat and railway lines, and has an extensive system of electric street railways, which connect it with a number of adjacent cities. It is one of the most noted centers of cotton manufactures in the United States, having thirty-five factories producing various cotton products and employing 15,000 persons. Other manufactures embrace clothing, cordage, glass, leather, machinery, carriages, soap, hardware, and utensils. The Wamsutta mill comprises the largest cotton

manufactory in the world, and has aided in making New Bedford famous. The city has finely improved streets, excellent schools, splendid churches, and a number of charitable, scientific, and educational institutions. Its public library includes 80,000 volumes. It takes rank as the fifty-eighth city of the United States. Population, 1900, 62,442.

NEWBERN, a city in North Carolina, county seat of Craven county, situated at the confluence of the Trent and Neuse rivers, 106 miles southeast of Raleigh. It has railroad and navigation connections, well improved streets, and engages in the manufacture of turpentine, cotton-seed oil, furniture, tobacco products, candy, cotton goods, and gumwood plates and dishes. The fisheries in the vicinity are important. Waterworks, electric lighting, pavements, and a fine courthouse are among the improvements. Newbern was founded by Swiss settlers in 1701, and until 1793 it was the capital of the province of North Carolina. In 1862 it was captured for the Federals by General Burnside. Population, 1900, 9,090.

NEWBERRY, John Strong, geologist and author, born in Windsor, Conn., Dec. 22, 1822; died in New Haven, Dec. 7, 1892. He took a course of instruction in medicine at the Cleveland Medical College, and soon after made an extensive tour of Europe. On returning to America he settled at Cleveland, Ohio, as a physician, and in 1855 engaged with an exploring expedition that operated between the Columbia River and San Francisco. In 1857 he joined Lieutenant Ives to explore the Colorado River, and while there devoted ten months to making researches in the Grand Canon. He spent the summer of 1859 in exploring northern Arizona and New Mexico and southern Colorado and Utah, and in 1861 engaged as a member of the United States sanitary commission, taking charge of important work in relation to the military in the Mississippi valley. He was elected professor of geology at the Columbia School of Mines shortly after the close of the war, became state geologist of Ohio in 1869, and was engaged on the United States geological survey in 1884. Newberry ranks among the foremost geologists of his time, and many of his writings are considered standard. His works include "Botany, Geology and Zoölogy of Northern California and Oregon;" "Rock Oils of Ohio;" "Colorado River Explored;" "United States Sanitary Commission in the Valley of the Mississippi;" "Iron Resources of the United States;" "Fossil Fishes and Fossil Plants;" "Palæozoic Fishes of North America;" "Geology of the San Juan Expedition," and "Our Later Extinct Floras."

NEW BRIGHTON (brī'tŏn), a city of Beaver county, Pennsylvania, situated twenty-eight miles northwest of Pittsburg, on the Beaver River. The surrounding country is agricultural and dairying, and contains deposits of natural gas, petroleum, and coal. There are manufactures of lumber products, glass, machinery, twine, flour, wire, hardware, and vehicles. It is well connected by railroad and telegraph lines, and has fine schools, churches, and other public buildings. Population, 1900, 6,820.

NEW BRITAIN, a city of Connecticut, in Hartford county, nine miles southwest of Hartford. It is finely located, and has good railroad facilities and municipal improvements. Among the manufactures are hardware, musical instruments, cotton and woolen goods, jewelry, edged tools, cabinets, cutlery, locks, and machinery. The city has fine schools, and is the seat of a state armory, a Roman Catholic cathedral, a state normal school, and libraries containing 20,000 volumes. Population, 1900, 25,998.

NEW BRUNSWICK, a city of New Jersey, county seat of Middlesex county, on the Raritan River and several railroads. It is connected by the Raritan and Delaware Canal. Among the manufactures are india-rubber goods, boots and shoes, carpets, hosiery, needles, paper, cotton and woolen goods, vehicles, and machinery. It is the seat of Rutgers College, an institution founded in 1770, which has a library of 15,000 volumes and carries advanced courses of study. New Brunswick contains a theological seminary of the Reformed Lutheran Church, several fine schools, and many splendid churches. It has a large trade and modern municipal facilities, including electric street railways, waterworks, pavements, and electric lighting. Population, 1900, 20,006.

NEW BRUNSWICK, a province of Canada, located on the northeastern coast of North America, being south of Quebec and east of the state of Maine. It has an area of 28,200 square miles exclusive of the territorial seas, and a coast line of 500 miles. The surface is generally rolling, and in the northern portion are ranges of hills that extend from the Gulf of St. Lawrence toward the west and south as far as the northern part of Maine. There are many rivers and lakes, and the region furnishes an abundance of valuable timber, including such varieties as cedar, maple, pine, beech, spruce, oak, birch, walnut, chestnut, larch, elm, ash, and hemlock. The principal rivers are the St. John, Restigouche, Miramichi, and Washdemoak. Grand Lake is the most important of the interior bodies of water. Among the minerals most abundant are coal, gypsum, copper, manganese, and limestone. The coal area is estimated at 10,000 square miles, and the production of gypsum is ranked among the most important in the world.

Fishing, lumbering, and agriculture are important industries in New Brunswick. The fisheries yield herring, lobster, salmon, sardines, smelts, cod, and fry. Among the principal agricultural products are oats, potatoes, buckwheat, barley, wheat, and hay. The climate is healthful, but the

winters are long and cold. New Brunswick is rapidly developing in manufacturing enterprises, partly on account of its valuable natural resources, and partly because it is favorably situated as to water connections. The chief manufactures embrace canned fish, lumber, butter and cheese, clothing, and machinery. There are many excellent harbors and extensive canal improvements. Important railroad lines extend to all the interior towns. The coast is extremely foggy, especially in the spring and autumn, but navigation is protected by an extensive system of lighthouses, fog-horns, and fog-whistles. At present the railroad lines include 1,800 miles.

The region now included in New Brunswick was discovered by Sebastian Cabot in 1498, and from 1604 to 1713 was united with Nova Scotia in the French colony of Acadia. In the latter year it was ceded by France to England under the Utrecht treaty of peace, and in 1784 was organized as a separate province. After the Revolutionary War a large number of loyalists left the United States to settle in New Brunswick, and in 1867 it was made a province of the Dominion of Canada. The government is administered by a lieutenant-governor, who is aided by a legislative branch of one department, consisting of forty-four members. The province is represented by ten members in the senate of Canada and by fourteen in the house of commons. Schools are amply provided for under a system of public grants and taxation, and are free for the attendance of all classes. Besides the common schools, there are high schools in the cities, a normal school for the equipment of teachers, several excellent colleges, and the University of Brunswick, an institution maintained by the province. All important religious societies are represented, as also are many of the civic, educational, and scientific societies. Fredericton, situated on the St. John River, is the capital. St. John is the principal city and commercial center. Other cities include Moncton, Portland, Carleton, Saint Stephen, and Woodstock. Population, 1901, 331,120.

NEWBURG, a city in New York, county seat of Orange county, sixty miles north of New York City, on the Hudson River. It is beautifully situated on an elevated region, has important railroad facilities, and enjoys a large jobbing and manufacturing trade. Among the manufactures are cotton and woolen goods, farming implements, flour, ironware, paint, soap, brushes, leather, and machinery. The surrounding country is farming, dairying, and fruit-raising, and has productive coal deposits. Newburg has a fine system of public schools, many churches, and contains the Hasbrouck House, a structure of stone that served in 1782-83 as Washington's headquarters. This building is maintained by the state as a depository for historical relics. Population, 1900, 24,943.

NEWBURYPORT, a city of Massachusetts, in Essex county, on the Merrimac River, thirty-six miles northeast of Boston. There are extensive manufactures of silverware, boots and shoes, hats, carriages, spirituous liquors, cotton and woolen goods, ironware, and machinery. The city has a fine site, contains excellent municipal improvements, good schools, and numerous churches. Its public library was founded by Josiah Little in 1854, and now contains 35,000 volumes. Other public institutions are the Old Ladies' Home, Putnam Free School, Y. M. C. A. Memorial Building, Anna Jacques Hospital, and a marine museum. Population, 1900, 14,478.

NEW CALEDONIA, an island in the Pacific Ocean, located 790 miles east of Australia, about midway between New Guinea and New Zealand. It is 238 miles long, from five to thirty miles wide, and contains an area of 6,445 square miles. New Caledonia is of volcanic origin, has mountain ranges that reach a height of 8,000 feet, and its coasts are surrounded by coral-reefs and sand-banks. Fertile valleys penetrate the mountain regions, and its coast plains are also productive. The principal products include coffee, tobacco, sugar-cane, lumber, maize, and many varieties of fruit. It has valuable mineral deposits, notably copper, cobalt, and ironstone. The inhabitants consist principally of natives resembling the Papuan race, and besides them are many descendants of persons sent there by France as convicts. The natives are Canaques, who were formerly cannibals, but in the latter part of the last century they became quite highly civilized, and now engage in various industries, but principally in agriculture and sheep raising. The island was discovered in 1774 by Captain Cook, and in 1853 became a possession of the French, who made it a penal settlement in 1872. Numea, on Numea Bay, is the capital. Population, 62,300.

NEW CASTLE, a city of Pennsylvania, county seat of Lawrence county, on the Shenango River, fifty miles northwest of Pittsburg. It is an important railroad center. The surrounding country is farming and dairying, producing cereals, live-stock, and dairy products. It has extensive manufactures of street cars, flour, nails, tubes, rods, ironware, machinery, glass, vehicles, and pottery. Its municipal facilities are modern, including pavements, waterworks, and electric street railways. It has a fine system of public schools, two colleges, and an excellent public library. Population, 1900, 28,339.

NEWCASTLE-UPON-TYNE, a city and riverport of England, located in the confines of Northumberland county, but it forms a county by itself. It occupies a convenient site on the Tyne River, and owes its prosperity largely to the immense deposits of coal in its vicinity and to its convenient harbor. The city has extensive manufactures

of ships and all kinds of sailing vessels, locomotives, cannon, marine engines, machinery, carriages, cables, hemp, anchors, sails, shot, harness, glass, cement, and earthenware. It was a military station at the time the Romans occupied Britain, and in 1080 a fort called Newcastle was erected there by Robert Curthose, since which time it has been known by that name. The city is extensively connected by steamboat and railway lines, has a fine street car system, electric lighting, pavements, several well improved parks, and fine schools and colleges. Its most noted institutions include the St. Mary Hospital, Allan's endowed schools, Mechanics' Institution, Institute of Mining Engineers, a female orphan institution, Trinity Almshouse, Hospital of the Holy Jesus, St. Nicholas Cathedral, the Earl Grey Monument, and many excellent churches. Population, 213,120.

NEWCOMB (nū'kŭm), **Simon**, astronomer, born in Wallace, Nova Scotia, March 12, 1835. He graduated at the Lawrence Scientific School, Harvard, in 1861, and was appointed to teach mathematics in the United States navy. Later he secured an appointment to the naval observatory at Washington, and in 1877 published the official "American Ephemeris and Nautical Almanac." Newcomb organized the government expedition that observed the transit of Venus in 1874, and in 1882 made an observation of the same phenomenon from the Cape of Good Hope. In 1884 he was elected to the chair of mathematics and astronomy in Johns Hopkins University, which he filled in connection with his other duties. His writings include many important articles on various scientific subjects, and a large number of works in relation to the planets. Among the honors conferred upon him is the British Copley medal, awarded in 1890.

NEWELL, Robert Henry, author, born in New York City, Dec. 13, 1836. His first work in literary pursuits was in connection with newspapers, and in 1858 he became assistant editor of the "New York Mercury." He held a similar position on the "New York World" from 1869 to 1872, and in 1874-76 was editor of "Hearth and Home." At the time of the Civil War he published a series of papers under the name of Orpheus C. Kerr, meaning "office-seeker," which attained such general popularity that he afterward published them as "Orpheus C. Kerr Papers." Among his publications are "Palace Beautiful and Other Poems;" "The Martyr President;" "Between Two Fires;" "Studies in Stanzas;" "Smoked Glass," and "There Was Once a Man." He died July 11, 1901.

NEW ENGLAND, the name applied collectively to the six northeastern states of the United States, including Maine, Vermont, New Hampshire, Massachusetts, Connecticut, and Rhode Island. The total area of these states is 66,465 square miles, and the population is equal to about one-thirteenth of the republic. The entire region was granted by James I. in 1606 to the Plymouth Company as North Virginia, but in 1614 John Smith made a map of the coast and named the region New England.

NEWFOUNDLAND, an island situated in the Atlantic Ocean, opposite the mouth of the St. Lawrence River, and separated from Quebec and Labrador by the Strait of Belle Isle. The island has an area of 42,734 square miles. It is a British possession, but does not form a province of the Dominion of Canada. The north coast region of Labrador is a dependency of Newfoundland, and the two constitute the British colony of Newfoundland. Its surface is largely rolling, and in some portions it is greatly broken, though the soil is fertile. Numerous gulfs and inlets indent the coast from all sides, while many rivers supply excellent drainage, the larger streams being Victoria, Gander, Exploits, Humber, and St. George rivers. Hundreds of marshes and lakes are situated in the interior, the largest bodies of water being Red Indian, Grand Pond, Gander, Round Pond, and Birchy Pond lakes. The climate is modified to a considerable extent by the Gulf Stream, but its modifying influence gives rise to extensive fogs. Its mean average temperature is somewhat higher than the adjacent parts of the neighboring continent, the thermometer rarely sinking below zero in winter, and seldom rising above 80° in summer.

Newfoundland is rich in minerals, producing considerable quantities of coal, copper, lead, gypsum, iron, nickel, gold, silver, and valuable building stone. The fisheries have been of vast value from the early settlement of America, the species embracing salmon, cod, herring, seal, lobster, and whales. These and other varieties are abundant, and the fisheries are counted among the most valuable in the world. In portions of the interior of the island still abound vast numbers of wild fowl, and there are also such fur-bearing animals as the bear, marten, reindeer, beaver, wildcat, and wolf. The celebrated Newfoundland dogs comprise a large part of the domestic animals. Low forests exist in sheltered places, but generally the plants are stunted herbs and bushes, and farming is carried on to a very limited extent. There is an important export and import trade with the United States and Canada. A railway line extends from Port-au-Basque, on the southwestern shore, in a great curve through the interior to St. Johns, on the eastern coast, and there are several branch lines, the entire system comprising a total of 850 miles. Cable lines connect the island with the American continent. The first Atlantic cable line built to Europe extends from the island to Heart's Content Harbor, Ireland. Public schools are maintained by government grants and taxation, and all the principal religious denominations have a strong representation. Manufacturing is

receiving marked attention and encouragement, particularly shipbuilding, metal products, and the preservation and curing of fish and fish products.

Newfoundland was discovered in 1497 by John Cabot, and visited by Sebastian Cabot the following year. The English founded their first settlements in 1621. For many years the French endeavored to obtain possession of the island, but it remained constantly under British control. The treaty of Utrecht, in 1713, gave the French the right to fish along its coasts, and also to occupy a portion of the coast plains for curing purposes. Its government was administered directly from England until 1833, when a more satisfactory form was granted, and a second modification was made in 1855, by which greater powers were vested in the local authorities. Public affairs are at present administered by a governor, who is assisted by an executive council of seven members, a legislative council of fourteen members, and a legislative assembly of thirty-six representatives, the latter being elected by popular suffrage. St. Johns is the capital and commercial center. It has the most important harbor of the island. Other towns of note include Trinity, population, 17,800; Grace Harbor, 10,000; and Twilling Gate, 3,500. The total population of the island is 212,500, and of its dependency in Labrador about 5,100.

NEWGATE, a London prison of historic interest, located at the west end of Newgate street, opposite the Old Bailey. The name was derived from its being at one time a new gate; the name was compounded prior to 1218. It is no longer used as a prison proper, but serves as a place to detain prisoners temporarily until tried in the central criminal court near by, and is also the place where execution by hanging is carried out. The walls of Newgate are high and windowless.

NEW GUINEA (gĭn'ē), or **Papua**, a large island situated north of Australia, and separated from that continent by Torres Strait. It has a length of nearly 1,500 miles, a width of from fifteen to 430 miles. The area is estimated at 310,000 square miles, thus being the largest island in the world. Careful explorations of the interior were not made until within recent years. It is known that great chains of mountains trend across it in various directions, some of which attain to a height of about two miles. In various parts are rocky formations that render cultivation impossible, but vast tracts of it are fertile, and there are extensive forests of tropical trees, many of which rank among the largest in the world. The animals include lizards, crocodiles, opossums, wild hogs, tree-kangaroos, serpents, and many varieties of beautiful and curious birds, including pigeons, parrots, birds of paradise, kingfishers, and the cassowary. Its climate is warm and damp, rainfall is abundant, and in many parts the vegetable growths are very luxuriant. The Gulf of Papua, Huon Gulf, Humboldt Bay, and Geelwink Bay are the principal coast indentations. The chief rivers include the Amberno and Fly, these being navigable for some distance at all times of the year, but during the rainy season they rise considerably and form an extensive navigation area. Papuan natives make up the principal part of the population, but there are also a considerable number of Malays, Karons, and eastern Polynesians. Its principal productions embrace lumber, sweet potatoes, rice, tobacco, yams, sugar, rum, maize, wheat, millet, sago, cocoa, oranges, and other varieties of tropical fruits.

New Guinea is a possession of three European powers—Germany, England, and Holland—who own respectively Kaiser Wilhelm's Land, British Guinea, and Dutch Guinea. Kaiser Wilhelm's Land occupies the northeastern part. It contains an area of about 70,200 square miles and a population of 175,000. The region was formerly governed by the German New Guinea Company and an imperial commissioner, but in 1899 it was placed directly under imperial control, and with it are included the islands of the Bismarck Archipelago. Stations exist at Constantinhafen, Finschafen, Hatzfeldhafen, and elsewhere, and the exports embrace principally lumber, bamboo, dates, tobacco, and tropical fruits. British Guinea embraces an area of 88,500 square miles and a population of 360,000. The principal settlement is at Fort Moresby, and the exports consist of pearl shells, tobacco, Areca, cabinet woods, and tropical fruits. Dutch Guinea has an area of 151,500 square miles, about one-half of the island, and the government is administered from the settlement at Ternate. The colony embraces the western portion of the island. Its soil is less fertile than that of the regions under German and English control, though there are valuable forests and extensive deposits of minerals. The population is 212,000, thus making the population of the entire island about 750,000.

New Guinea was discovered by the Portuguese in 1511, and named by Ortiz de Retez, who visited the island in 1546. Dutch navigators landed to obtain fresh water in 1676, but little attention was paid to it until in 1828, when the Dutch formed a settlement on its western coast. Progress was extremely slow until in 1858, when the Dutch established a colony that has since become prosperous. They also have made extensive explorations along the coast and in the interior. England annexed the southeastern part in 1883. The claims of Germany are based upon explorations and settlements founded in 1884.

NEW HAMPSHIRE, one of the thirteen original states of the United States, whose

northern boundary is formed by Canada, eastern by Maine and the Atlantic Ocean, southern by Massachusetts, and western by Vermont. Its total area is 9,305 square miles, being about one-fourth as large as Indiana. The general slope is toward the south. Its average elevation is placed at about 1,190 feet. The White Mountains occupy the north-central part and culminate in Mount Washington, height 6,295 feet, but groups of hills extend both toward the north and south. Its drainage is chiefly by the Connecticut, Merrimac, Salmon, Androscoggin, Ashuelot, Contocook, and Ammonoosuc rivers. The state has numerous beautiful lakes, of which the principal ones are Winnipiseogee, Squam, Umbagog, and Sunapee. Many of the rivers are noted for the swiftness of their currents, because of which they are of vast utility in furnishing power for various manufacturing enterprises. The climate is agreeable, though cold in the winter. Its mean annual temperature is placed at 49°. The rainfall averages forty-five inches. Vast forests formerly covered the state, and there are still valuable productions of timber, the chief varieties being maple, oak, pine, hickory, chestnut, beech, cherry, and poplar.

New Hampshire engages extensively in manufacturing, its cotton mills including a total of 1,500,000 spindles. Besides cotton goods, there are extensive manufactures of boots and shoes, tobacco products, hosiery, paper, woolen goods, flour, mixed textiles, lumber products, earthenware, machinery, and ironware. The minerals embrace principally granite and clay, but there are productions of copper, mica, limestone, and ocher. Agriculture and stock raising are also important industries. The principal crops include corn, oats, barley, rye, wheat, buckwheat, and vegetables. Live-stock, such as horses, milk cows, other cattle, sheep, and poultry, is reared in abundance. The state has railroad lines aggregating 1,300 miles. Transportation is also facilitated by several canals and navigable rivers. The lakes and streams yield an abundance of excellent fish.

The public school system of New Hampshire is supervised efficiently, and contains elementary and high schools with well articulated courses of study. There is a public normal school for the training of teachers at Plymouth, and normal training is given in several public high schools. The state maintains excellent benevolent, reformatory, and correctional institutions, and has a number of fine colleges and universities. Dartmouth College is located at Hanover. It was founded in 1769, and ranks as one of the many excellent educational institutions of America, having at present sixty professors and 750 students. Other institutions of learning maintained in the state include a college of agriculture and mechanical arts, schools of medicine, business colleges, and various denominational and private institutions. There are about 800 church buildings belonging to the different denominations, the numerical rank being Congregationalists, Baptists, Methodists, Roman Catholics, Adventists, Episcopalians, and Universalists. In the state are published 155 periodicals, eighteen being dailies and 125 weeklies.

The first settlements in New Hampshire were made in 1623 near Dover and Portsmouth, under a grant of land to Sir Ferdinando Gorges and John Mason, the grant covering the region between the Merrimac and the Kennebec rivers. In 1629 Mason obtained a separate grant for the territory between the Merrimac and the Piscataqua. From 1641 to 1679 the region formed a part of the Massachusetts colony, again in 1689-92, and again in 1699-1741. Colonial governors ruled during the intervening dates. A temporary government was formed in 1775, when it entered the American confederacy, and the present constitution was adopted in 1792. The state actively supported the Revolution, and on June 21, 1788, ratified the national constitution. It is divided into ten counties. Concord is its capital. From its large deposits of granite it is popularly called the Granite State. The most important cities of the state besides its capital are Manchester, Nashua, Dover, Portsmouth, Keene, Rochester, Somersworth, Laconia, Claremont, Berlin, and Exeter. In 1900 the state had a population of 411,588. The total colored population is 797, or 2 per cent., including 662 Negroes and 112 Chinese. There is an excess of females over males, the latter representing 49.9 per cent.

NEW HAVEN, a city of Connecticut, county seat of New Haven county, located on Long Island Sound. It is the most important seaport of the state, has good railroad and steamboat connections, and enjoys a large and important domestic and foreign trade. Its regularly platted streets are improved by fine pavements, electric lights, street railways, and waterworks. The manufactures embrace rubber goods, machinery, ironware, jewelry, needles, vehicles, firearms, musical instruments, earthenware, and textile fabrics. There are numerous beautiful churches, a fine system of public schools, and extensive public buildings, including a fine county courthouse and a government building. New Haven is the seat of Yale University, one of the most noted educational institutions of America. It has excellent equipments, fine buildings, extended courses of study, and several affiliated colleges. Sheffield Scientific School, Hopkins Grammar School, and several other important institutions are also situated in New Haven. The city dates from 1638, when it was founded by the English. It was jointly the capital with Hartford until 1873. At present it ranks as the thirty-first city of the United States. Population, 1900, 108,027.

NEW HEBRIDES, a chain of islands in

the Pacific Ocean, located east of Australia and north of New Zealand. They embrace about thirty islands of volcanic origin, the entire group containing an area of about 3,000 square miles. Among the principal islands are Espiritu Santo, area about 2,850 square miles; Mallicolo, 1,150 square miles; Ambrym, 1,500 square miles; Sandwich, 435 square miles; Tanna, 175 square miles; and Erromango, 650 square miles. The islands contain a number of active volcanoes, but possess much fertile soil and excellent timber. They produce sugar cane, yams, bananas, cocoanuts, and other varieties of tropical fruits. Horses, cattle, and sheep are reared in abundance. The Portuguese discovered these islands in 1606, but they are claimed by the British on the strength of explorations made by Captain Cook in 1773. The inhabitants are estimated at 225,000, most of whom are of Polynesian birth.

NEW IBERIA, a city in Louisiana, capital of Iberia parish, twelve miles north of Vermilion Bay, an inlet from the Gulf of Mexico. The surrounding country is fertile, producing cereals, cotton, sugar cane, and fruits. Electric lights, waterworks, and several fine public buildings are among the improvements. It is the seat of Howe Institute, a seminary, and several fine schools. Population, 1900, 6,815.

NEW JERSEY, one of the original thirteen states of the United States, classed with the Middle Atlantic group. It has an area of 7,815 square miles, being about one-third as large as West Virginia. It is situated south of New York and east of Pennsylvania, and contains a seacoast of 120 miles. The state is included largely in the Atlantic coast plain, only its northwestern part being traversed by chains of the Appalachian Mountains. In the central part are large tracts of highly fertile lands. Along the coast extends a region diversified by sandy tracts, on which pine woods abound. The state is well watered and drained, the principal rivers being the Delaware, Raritan, Passaic, Maurice, and Great Egg Harbor. Its coast inlets include Delaware and Lower Bay, and on its coast are Cape May and Sandy Hook. The climate is generally healthful, but varies according to altitude and proximity to the sea. It has an average rainfall of fifty inches, and the mean temperature is about 52°. The state formerly contained vast forests of valuable timber, some of which still remains, the principal varieties being chestnut, pine, cedar, ash, oak, maple, elm, hickory, and basswood.

The state possesses valuable deposits of iron ore, copper, granite, sandstone, slate, limestone, and zinc, the production of iron being the most important. Agriculture and stock raising receive marked attention. The principal crops include potatoes, oats, wheat, corn, rye, buckwheat, hay, vegetables, and fruits. Milk cows represent the largest class of cattle, and the annual output of milk for the market, as well as cheese, receives careful attention. There are also considerable interests in rearing other cattle, horses, sheep, swine, and poultry. The manufacturing enterprises of New Jersey are by far the most important of the state. Among the principal manufactures are cotton and woolen goods, boots and shoes, silk goods, tobacco products, spirituous liquors, terra-cotta products, brick, machinery, ironware, sugar, glass, and leather. The average value of manufactures aggregates annually about $375,500,000. Commercial enterprises are facilitated by its situation on the Atlantic coast, by the navigation of the Delaware and Hudson rivers, and by its numerous canals and railway lines. These conditions taken in connection with the great cities within or near the state give a vast market for its produce. The railroad lines aggregate a total of 2,500 miles.

New Jersey has long supported a vigorous policy in relation to public instruction. There are excellent elementary schools in all parts of the state, while high schools are maintained in the towns and cities, and the whole system is supplemented by a number of state and private institutions of higher learning. Princeton University, at Princeton, was founded in 1746, and is one of the most efficient institutions in America. Rutgers College, at New Brunswick, is another excellent center of learning, and in connection with it is the state school of science and agriculture. The state maintains three public normal schools, which have an enrollment of 2,500, and normal training is given in twelve high schools. There is a soldiers' home at Newark, a state prison at Trenton, and other benevolent, reformatory, and correctional institutions are maintained by adequate appropriations. Many private and denominational schools are supported by the different religious and non-sectarian interests. The state has within its border 2,250 church edifices, whose property interests are valued at $31,500,000. All the leading denominations maintain church organizations. Many excellent scientific and educational societies are maintained, and large libraries are abundant. New Jersey has 385 periodicals, which include fifty-five dailies and 285 weeklies.

The first settlement made in New Jersey was at Bergen, in 1617, by the Dutch. A fort was built near the site of Camden by the English under Cornelius May in 1623, and settlements were founded about the same time by the Swedes. In 1655 the Dutch under Governor Stuyvesant erected Fort Nassau on the Delaware and compelled the Swedes to recognize their authority. The duke of York received a grant of the region from Charles II., and he transferred the country between the Delaware and the Hudson to Lord Berkeley and Sir George Carteret. Soon after the region was divided by its proprietors into East and West Jersey,

the boundary line running from Little Egg Harbor northwest to the Delaware, and in 1682 East Jersey was purchased by William Penn and his associates. In 1702 the two colonies became united in a royal colony. After 1738 it was under the direction of royal governors. Indian troubles were avoided by purchasing titles, but when the Revolutionary War began the colony became a principal seat of contention and battled nobly for American independence. It ratified the national constitution on Dec. 18, 1787, and adopted its present constitution in 1844. Its growth and prosperity have been almost without intermission. There are twenty-one counties in New Jersey. Its popular name is Jersey Blue State. Trenton is its capital. Other important cities include Newark, Jersey City, Paterson, Camden, Elizabeth, Hoboken, Bayonne, New Brunswick, Orange, Passaic, Bridgeton, Plainfield, Union, Perth Amboy, Millville, Phillipsburg, Morristown, Harrison, Atlantic City, and Burlington. Population, 1900, 1,883,669. The total colored population is 71,352, or 3.8 per cent., including 69,844 Negroes and 1,393 Chinese.

NEW LONDON, a city in Connecticut, county seat of New London county. It is situated on the Thames River, about three miles off the coast of Long Island Sound, seventy miles northeast of New York City. It has an excellent harbor, is a port of entry, and contains convenient railroad and steamboat facilities. Among the manufactures are hardware, cotton and woolen goods, crackers, sewing-silk, ships, boilers, machinery, and utensils. The city has electric lights, street railways, waterworks, pavements, several libraries, and good schools. There are productive fisheries off the coast. It is an important seat of trade in whale and seal products. Population, 1900, 17,548.

NEWMAN (nū'mạn), **Francis William**, educator and author, born in London, England, June 27, 1805; died Oct. 4, 1897. He was a brother of Cardinal Newman, graduated at Oxford, and in 1826 became a fellow of Balliol College. In 1830 he went on missionary work to Mesopotamia. He became tutor of Bristol College in 1833, was made professor of classics at Manchester New College in 1840, and from 1846 to 1863 held a similar position at University College, London. Professor Newman obtained a reputation as a student of Semitic and African languages, and ranked as a versatile linguist. His writings include "Politics of Aristotle;" "History of the Hebrew Monarchy;" "Christian Commonwealth;" "Moral Influence of Law;" "Life After Death," and "Early History of Cardinal Newman."

NEWMAN, John Henry, Cardinal, Catholic divine, born in London, England, Feb. 21, 1801; died near Birmingham, Aug. 11, 1890. He studied at Ealing and Trinity College, Oxford, graduated there in 1820, and the following year wrote a poem entitled "St. Bartholomew's Eve." He was elected a fellow of Oriel College in 1822, where he formed an intimate friendship with Dr. Pusey and Hurrell Froude. His first work, entitled "The Arians of the Fourth Century," was published in 1832. It was written with the intention of demonstrating that the Arian heresy originated at Antioch as one of the Judaizing heresies. The same year Newman made a tour with Hurrell Froude to the Mediterranean, where he formed his ideas regarding clerical authority independent of the state, and also wrote a number of poems that afterward were published in a volume entitled "Lyra Apostolica." He wrote his best known poem, "Lead, Kindly Light," while on his return voyage to England. At that time he became recognized as one of the foremost leaders of ministers in England. He entered into the tractarian movement, which had begun in 1833, and many of the tracts that appeared were from his pen. In these tracts and public lectures he defined the distinctions between the Protestant and Roman Catholic faiths, and asserted that the Anglican Church holds a place immediately between the Church of Rome and popular Protestantism. In 1843 he withdrew from the Anglican Church, and on Oct. 9, 1845, was received into the Roman Catholic Church. He spent the following year and a half in Rome. Cardinal Newman was the head of the English moderators, and in recognition of their aid Leo XIII. made him a cardinal on May 12, 1879. He was a man of the highest moral and spiritual aspirations, possessed a rare intellect, effective power of speech, and liberal culture. Among his writings not mentioned above are "Loss and Gain;" "Grammar of Assent;" "Catholicism in England;" "Development of Christian Doctrines," and "Dream of Gerontius."

NEW MEXICO, a southwestern territory of the United States, bounded on the north by Colorado, east by Texas and Oklahoma, south by Texas and Mexico, and west by Arizona. It has an area of 122,580 square miles, being nearly as large as the combined areas of Kentucky and North and South Carolina. Ranges of the Rocky Mountains traverse it from north to south, with various separated groups of hills and mountains in different parts. The altitude in the northern part ranges from 5,000 to 7,000 feet, and there is a gradual slope toward the south, where the altitude is from 3,000 to 4,000 feet. Among the principal ranges are the Sierra Capitan, Manzano, Taos, Oscura, Black, Chusca, Osouro, Guadalupe, San Andres, and Sierra Hacheta mountains. The highest peaks include Lake Peak, 12,405 feet; Mora Peak, 12,020 feet; Costilla Peak, 12,615 feet; and Brazo Peak, 11,212 feet. A considerable portion of the Staked Plains, or Llano Estacado, extends from Texas into the southeastern part, and has an elevation of about 3,250 feet. The drainage is principally toward the south. Among the

principal rivers are the Rio Grande, Pecos, Cimarron, Puerco, Canadian, San Juan, and Rio Chama. The streams rise largely from springs, and when the mountain snow melts in the summer season they become greatly enlarged. The annual rainfall ranges from fourteen to eighteen inches. The mean temperature is about 49°, and the extremes range between 85° and a few degrees below zero.

New Mexico possesses a large area of fertile soil, but agriculture is impossible without irrigation. However, there are many streams quite suitable for that purpose, and large investments have been made to carry the water over many thousands of acres. Extensive irrigation canals were constructed from the Black Range within recent years, and there has been more or less activity in nearly all parts since railroad building commenced. The region was occupied in an early period by natives who recognized the utility of irrigation, and many traces of their works still remain. All classes of cereals and vegetables can be produced with success. New Mexico is beginning to take very high rank in the production of fruits, such as are grown in temperate and semi-tropical climates. The principal crops at present include wheat, oats, barley, rye, corn, sugar beets, vegetables, and many varieties of fruits. Stock raising is an important industry, but sheep are reared by far the most extensively, though there are also large interests in raising cattle, mules, horses, swine, and poultry. Alfalfa and other varieties of grasses yield abundantly. There are considerable manufactures from products of the mines, tobacco, cigars, beet sugar, flour, lumber products, and utensils. The region has an abundance of fine timber, the supply being almost inexhaustible, including principally pine, cottonwood, and box-elder. Its mineral wealth is of vast importance, including extensive deposits of coal, gold, silver, iron, sandstone, limestone, lead, and gypsum. The coal of New Mexico embraces the best quality yet found west of the Mississippi, including both bituminous and anthracite. There are a number of trunk railroad lines and several branches, the total including 2,125 miles.

The educational affairs of New Mexico are guarded with much concern, elementary and secondary schools being maintained in all regions where settlements exist. It has a number of colleges, universities, and institutions for the support and care of the blind, deaf and dumb, unfortunate, and incorrigible. The University of New Mexico is located at Albuquerque; the College of Agriculture at Las Cruces, with branches at Aztec and Las Vegas; a normal school at Las Vegas; a school of mines at Socorro; and a military institute at Roswell. Besides these are other public institutions, several denominational colleges, and a number of schools supported by the federal government for the education of Indians. All the leading religious denominations are well represented. There are seventy-five periodicals, of which six are issued daily and sixty weekly.

The region now included in New Mexico is among the earliest explored by white men, being visited by the Spaniard Nunez in 1537. It was explored in 1581, when it was named New Mexico from its mineral wealth. Santa Fe was founded about 1609, and is one of the oldest cities in the United States. The Pueblo Indians carried on a protracted warfare against the Spaniards, and when Mexico secured independence, in 1822, it was included in that country. General Kearney captured Santa Fe in 1846, and by the treaty of Guadalupe Hidalgo it became a possession of the United States, being ceded in 1848. It was organized as a territory on Sept. 9, 1850, when it included Arizona and a part of California and Colorado, and in 1853 a portion of the Gadsden Purchase was annexed. Its present boundaries were established in 1866, and with the beginning of railroad construction, in 1878, it began to develop rapidly. Santa Fe is the capital. Its principal cities include Albuquerque, Las Vegas, Socorro, Raton, Roswell, and Silver City. Population, 1900, 195,310. Of this number 15,103, or 7.7 per cent., are colored, including 1,610 Negroes and 13,144 Indians. The per centage of males is 53.4.

NEW ORLEANS (ôr'lẹ-anz), an important city of the United States, the largest in the state of Louisiana, on the Mississippi River, 105 miles from its mouth. It was so named from the older portion that extended round the curve of the river, its name meaning crescent city. Its location on the Mississippi, near the Gulf of Mexico, gives it vast commercial advantages, and it now ranks second in importance as an export city of the United States. Many important railroad lines center there from the United States, and it also has connection by railways with Mexico, while steamship navigation on the gulf extends its communication with all the principal commercial centers of the world. Several canals terminate there, giving the city additional advantages in connecting transportation facilities with the river and gulf lines. New Orleans has vast manufactures, the principal products being cotton and woolen goods, carriages, furniture, spirituous liquors, sugar, tobacco products, machinery, cooperage, lumber products, molasses, clothing, cotton-seed oil, and fertilizers. The general facilities are modern, including a vast system of street railways, electric and gas lighting, waterworks, excellent public schools, and numerous libraries. Among its notable buildings is the United States customhouse, constructed of Quincy marble, which, next to the United States capitol, is the largest public building in the United States. Other buildings of note include the city hall, courthouse, Roman Catholic cathedral, Masonic and Odd Fellows' halls, Merchants' Exchange, Mechanic

Institute, Howard Memorial Library, Academy of Music, United States Marine Hospital, Sofia Newcomb Memorial College, and many excellent hotels, theaters, and churches. Tulane University is one of its excellent institutions of learning, having eighty professors and about 950 students. There are many fine public libraries, the total number of volumes being about 160,000.

The city of New Orleans was founded in 1718, and from 1864 to 1880 was the capital. France ceded it and adjacent territory to Spain in 1769; it was receded to France in 1801, and in 1803 it became a part of the United States by virtue of the Louisiana Purchase. General Packenham defended it successfully in 1815, and later General Jackson defeated the British with great slaughter. It became the most important commercial and military seat of the Confederacy in 1860, but in 1862 Commodore Farragut captured it for the Federals, and it was soon after occupied by General Butler as military governor. The inhabitants are in large part descendants of French, Spanish, and mixed races, and include a large number of Germans, Italians, Irish, Scandinavians, Jews, Negroes, Mongolians, and Indians. The convenient location of New Orleans on the most important interior trade route of America, its railroads, and extensive embankments to protect it from overflows all have contributed to its development in wealth and educational growth. At present it ranks as the twelfth city of the United States. Population, 1900, 287,104.

NEW PHILADELPHIA, a city of Tuscarawas county, Ohio, eighty miles south of Cleveland, on the Tuscarawas River. The surrounding country is fertile and contains extensive deposits of coal, salt, and iron ore. There are manufactures of woolen goods, machinery, paper, flour, agricultural implements, hardware, nails, cast iron pipes, and earthenware. It is the junction of a number of important railroads, has fine schools and churches, and is improved by a number of municipal facilities, including pavements and rapid transit. Population, 1900, 6,213.

NEWPORT, a city in Kentucky, county seat of Campbell county, at the junction of the Licking and Ohio rivers, opposite Cincinnati, with which it is connected by an extensive iron bridge. It is handsomely located on a fine site, has good municipal facilities, and is a favorite residence of many Cincinnati business men. There are important manufactures of watch-cases, hardware, stoves, machinery, engines, textiles, and earthenware. It is connected extensively by railroad and steamboat lines, has good schools, many churches, and several fine libraries. Among its improvements are pavements, waterworks, and electric lights. Population, 1900, 28,301.

NEWPORT, a city of Rhode Island, in Newport county, on Narragansett Bay, about thirty miles south of Providence. The surrounding country is agricultural, yielding cereals and fruits. It contains some of the finest summer residences in the world, which have given it a reputation as one of the most popular summer resorts of America. Near it, on Coaster's Harbor Island, is the United States Naval War College, and in connection with it is a naval training school and torpedo station. The city has excellent schools, finely improved streets, beautiful parks, and several large libraries, notably the Red Wood Library, founded in 1747. It has a considerable trade, and manufactures textiles, metal goods, clothing, webs, and utensils. Paved streets, waterworks, and electric street railways are among the improvements. Population, 1900, 22,034.

NEWPORT, a port city of England, on the Usk River, about four miles from Bristol Channel, and twelve miles northeast of Cardiff. It is situated in a picturesque region, having hills almost surrounding it, and contains manufactures of machinery, anchors, chain cables, sails, and earthenware. Its docks and wharves are extensive. It is the seat of the St. Woolos Church, and contains the old castle built in 1130 by Robert, earl of Gloucester. Population, 56,180.

NEWPORT NEWS, a city in Virginia, county seat of Warwick county, fourteen miles north of Norfolk, near the mouth of the James River. It is a port of entry and has a fine harbor. There are extensive wharves and large elevators, and it has connection with neighboring cities by an electric railway. The city has convenient railroad connections and modern municipal facilities, including pavements, electric lights, and waterworks. Peanuts are produced extensively in the surrounding country. It is one of the four largest grain shipping ports of the United States. Population, 1900, 19,635.

NEW ROCHELLE (rō-shĕl'), a town of Westchester county, New York, about sixteen miles from New York City, on Long Island Sound. It has good railroad connections, and is noted as a popular summer resort. New Rochelle is the residence of many New York business men. It has good schools and numerous churches. Among the manufactures are scales, cigars, utensils, clothing, and earthenware. Population, 1900, 14,720.

NEW SIBERIA (sī-bē'rĭ-ą), the name applied to a group of islands north of Siberia, whose area is estimated at 20,480 square miles. The principal islands are Kotelnoi, Fadievskoi, Liakov, and New Siberia. These islands are uninhabitable on account of severe cold. They contain neither bushes nor trees, but are valuable because of large quantities of fossils deposited in the soil, including bones and teeth of buffaloes, mammoths, and rhinoceroses.

NEW SOUTH WALES, a province in southeastern Australia, bounded on the north by Queensland, east by the Pacific

Ocean, south by Victoria, and west by South Australia. It has an area of 310,700 square miles, and a population of 1,385,500. The surface is diversified by ranges and groups of the Australian Alps, Blue Mountains, Grey Mountains, and Liverpool Ranges. Its slope is chiefly toward the west and south, but there is a fertile plain along the eastern coast. Among its principal rivers are the Murray, Darling, Lachlan, Murrumbidgee, Culgoa, Bogan, and Namoi. The geological formations on the east side of the great watershed belong mostly to the sandstone of the carboniferous system, and contain extensive deposits of coal. On the western slopes are vast granite formations. The coal fields are estimated to cover an area of 25,000 square miles, and the yearly output averages about 4,125,000 tons. Gold is of next importance among the minerals of New South Wales. It also has productive deposits of copper, silver, tin, sapphire, diamonds, emerald, zinc, cobalt, graphite, lead, iron, bismuth, manganese, and mercury. In the region are valuable deposits of petroleum, especially in the Blue Mountains, and it has numerous mineral springs.

Agriculture is successfully carried on, the principal crops being wheat, oats, barley, maize, and vegetables. Many varieties of fruit are grown, particularly grapes, and silk culture has been introduced successfully. Sugar cane is also an important product. Though the climate is favorable to health and the cultivation of plants, there are large areas that have insufficient rainfall for the growing of many cereal crops, and in those parts stock culture is the principal industry. Sheep raising is by far the most important branch, there being about 60,500,000 sheep in the province. Other stock includes cattle, horses, and swine. The manufactures embrace sugar, tobacco products, machinery, lumber products, spirituous liquors, soap, leather, woolen goods, clothing, earthenware, sailing vessels, and ironware. Telephone and telegraph lines extend to all parts of the province. There are 3,225 miles of railway open for traffic, and 7,500 miles of improved government roads. Many varieties of valuable timber are abundant, among them the pine, eucalyptus, cedar, palm, and gumwood.

New South Wales is the oldest colony in Australia. It was founded in 1788, when a penal settlement was established at Botany Bay. Convict immigration led to some degree of development, many persons being sent from England on the slightest pretext, and a large per cent. of the individuals thus settled there became highly prosperous. In 1840 it ceased to be a penal colony, when the lands were thrown open for settlement under more favorable conditions, and governmental institutions were founded in 1843. Victoria was made a separate colony in 1850, and in 1851 gold was discovered, which was soon followed by an immense immigration from all parts of Eurasia. A railway line was built from Sydney to Paramatta and opened for traffic in 1855, and this was soon followed by the construction of many interior and branch lines, thus leading to the rapid and prosperous development which it has enjoyed since.

The government is under Great Britain, and for local purposes a legislative council and legislative assembly are maintained. These two branches constitute the parliament, membership in the former being for life, and in the latter for three years, while the governor is nominated by the crown and is assisted by a ministry of ten members. Schools are maintained under a system of public taxation. They are free to the attendance of both sexes, and include 1,500 elementary and high schools. The University of Sydney was founded in 1852. It has departments of medicine, law, and arts, and receives revenues amounting annually to about $125,000. This institution is one of the best attended universities south of the equator, having about 1,500 students. It has fifty professors and lecturers, fine appliances, and a splendid library. Charitable, reformatory, and correctional institutions are adequately maintained, and also institutions for the study of agriculture, mining, dairying, and military science. Sydney is the capital and largest city, and ranks as the tenth commercial port of the world. Other cities of importance include Broken Hill, Goulburn, Paramatta, Bathurst, Albury, Maitland, Newcastle, and Wickham. New South Wales gave hearty support to the project of forming the Australian Confederation, of which it is an influential member.

NEWSPAPER, a publication issued at frequent and regular intervals for general circulation, and intended to convey current news, represent a particular class or body, or advocate some particular view or policy in relation to public or special interests. It is thought that bulletins sent from Rome, known as acta diurna, several centuries before the Christian era, for the purpose of giving accounts of the progress being made by the imperial army, constituted the first enterprise similar to newspapers and journals published at present. These journals passed directly to the generals, who caused them to be communicated to the entire army. They not only contained an outline of the government policy, but also conveyed information in relation to punishment, deaths, sacrifices, and other matters of general interest. The "Pekin Gazette," published in China, was founded about 1350 A. D., and is the oldest daily newspaper now issued regularly. It is certain that the first printed newspaper in the world appeared in Germany in the latter part of the 15th century, the earliest publication being the "Neue Zeitung" at Augsburg. See **Journalism.**

NEWT (nūt), or **Eft**, the common name applied to various classes of amphibians closely resembling the salamanders. The

form is more slender than that of salamanders, their habits are more active, and they are oviparous. The different species are strictly air-breathers. They are aquatic in habits, and, though the larval gills fall off when the animal is about three months old, they retain the larval tail. In all species the

WATER NEWT.

skin is soft and has warty lumps. The tail is elongated and flattened while in the water, but becomes somewhat rounded when the animal frequents the land. Newts vary in length from three to seven inches, and the male of most species is distinguished by a fleshy ridge or crest on the back. They are widely distributed, and are regarded as the most obnoxious animals in appearance, but they are not in any sense venomous. Their food consists of insects' larvæ, snails, worms, and frog spawn. The limbs are weak, which gives them an awkward appearance when crawling on the land, but in the water they move with considerable ease by paddling with the tail. Various parts, such as the legs and tail, are reproduced when lost by accident, as is the case with many animals allied to them. They are often mistaken for lizards, but differ widely from them in many important characteristics.

NEWTON, a city in Kansas, county seat of Harvey county, on Sandy Creek, 135 miles southwest of Topeka. The surrounding country is agricultural, and contains extensive deposits of stone and coal. Among the manufactures are flour, carriages, dairy products, soap, candy, machinery, and ironware. The city has good railroad connections, several fine churches and schools, and a public library. It has a growing trade in merchandise. Population, 1900, 6,208.

NEWTON, a city of Massachusetts, in Middlesex county, on Charles River, about seven miles west of Boston. It has important railroad connections, electric lights and street railways, several high school buildings, fine churches, and a public library of 50,000 volumes. It is also the seat of Newton Theological Seminary. There are manufactures of ink, hosiery, paper, soap, dyestuffs, machinery, chemicals, cordage, india-rubber goods, and vehicles. The site was first settled in 1630, and the city became incorporated in 1873. It is a favorite residence of many Boston merchants, and is often called "The Garden City" of New England. Population, 1900, 33,587.

NEWTON, Hubert Anson, astronomer, born in Sherburne, New York, March 19, 1830; died in New Haven, Conn., Aug. 12, 1896. He completed the course at Yale in 1850, where he later made a special study of mathematics, and in 1853 took charge of the department of mathematics, of which branch he became full professor in 1855. Newton took high rank as a mathematician, made discoveries in astronomy that led to a successful computation of the orbit of the comet of 1866, and was influential in causing the metric system of weights and measures to be published in educational text-books. A degree was granted him by the Michigan University in 1868, and he was otherwise honored by many American and foreign scientific societies. In 1885 he became president of the American Association for the Advancement of Science, was director-in-chief of the Yale Observatory, and for many years had editorial connection with the "American Journal of Science."

NEWTON, Sir Isaac, philosopher and mathematician, born at Woolsthorpe, England, Dec. 25, 1642; died March 20, 1727. He attended a village school, afterward studied at a grammar school in Grantham, and in 1660 entered Cambridge University, where he graduated in 1665, receiving the degree of bachelor of arts. In 1666 he was chosen a fellow of Trinity College, Cambridge, and in 1668 received the degree of master of arts. He became professor of mathematics at Trinity College in 1669, three years later was made a member of the Royal Society, and in 1689 entered parliament as one of the representatives of the university. He retained his seat only a year, and, while not taking part in any of the debates, he was a studious and active member. In 1696 he became warden of the mint, and in 1699 was appointed to the office of master of the mint, a position he held until his death. The university again selected him as a representative to parliament in 1701, and for some time most of his efforts were in the line of public duty, but his intervals were devoted studiously to the study of many scientific problems.

SIR ISAAC NEWTON.

Newton was chosen president of the Royal Society in 1703, which position he held until his death, a period of twenty-five years, being reëlected each year. Queen Anne

also knighted him in 1703, and he was otherwise honored by many celebrated societies of Europe. He is distinguished more on account of his service to astronomy and philosophy than for his public service, his philosophical investigations dating from his early school life. From Voltaire we have the anecdote that Newton secured his first idea of universal gravitation, in 1666, from observing the fall of an apple from a tree, and this tree was preserved till 1820, when it was cut down, owing to decay, but it is still treasured as a relic. The fall of the apple induced him to investigate systematically the force that holds the planets and satellites in their orbits. Accordingly he used the earth's radius as a measure, but was at first unsuccessful because of the erroneous estimate that prevailed in regard to the earth's diameter. However, he afterward reduced the estimate of the earth's diameter to more accurate figures, being guided in this by Picard's measurement, and thereby successfully demonstrated that all bodies of our solar system are held in their orbits by gravitation.

Newton completed his researches of gravitation in 1684, and in 1687 published his celebrated work in relation to that phenomenon, entitled "Philosophiæ Naturalis Principia Mathematica." He also investigated the phenomenon of light, and published a valuable treatise in regard to its decomposition. He believed in what is known as the corpuscular theory, according to which light consists of minute particles of matter radiated in straight lines from a luminous object, the ray being endued with alternate fits of easy reflection and easy transmission. Newton demonstrated the practicability of using two lenses in telescopes; engaged extensively in mathematical analysis, especially the binomial theorem of numbers, and wrote a number of treatises on theological subjects. His greatest work is the one mentioned above, which is commonly known as Newton's "Principia." Other works of importance include "Treatise on Optics;" "Universal Arithmetic;" "Analytical Geometry;" "History of the Creation;" "Church History;" "Observation of the Prophecies of Daniel;" "Apocalypse of St. John," and "Historical Account of Two Notable Corruptions of Scripture." He was buried in Westminster Abbey, where a monument was erected to his memory.

NEWTON, John, general and engineer, born in Norfolk, Virginia, Aug. 24, 1823; died in New York City, May 1, 1895. He graduated with honors from the West Point Military Academy in 1824, became an assistant professor of engineering in that institution, and entered the army at the beginning of the Civil War. He commanded the defenses of Washington, and took part in the peninsular campaign. Subsequently he commanded at South Mountain, Antietam, and Fredericksburg, being promoted major-general shortly after the last named engagement. Later he took part in the battles of Chancellorsville, Gettysburg, and the capture of Atlanta in 1864, and after the war became an engineer of the regular army. He was in charge of the workmen who removed the obstructions at Hell Gate, in East River, and in 1887 became commissioner of public works in New York City.

NEW ULM, county seat of Brown county, Minnesota, on the Minnesota River, twenty-eight miles northwest of Mankato. It is surrounded by a fine agricultural and dairying country and has a large trade in farm produce. There are manufactures of flour, lumber products, and machinery. The Indians made a raid upon it in 1862, and a cyclone damaged it greatly in 1881. It has good municipal facilities and several fine schools. Population, 1900, 5,403.

NEW WHATCOM, a city in Washington, county seat of Whatcom county, on a bay of the Strait of Georgia, about eighty miles north of Seattle. It has an excellent harbor and good railroad connections. Electric lights, telephones, pavements, and waterworks are among the improvements. It has an important trade in lumber, farm products, minerals, and manufactured articles. There are a number of good schools and churches, a fine courthouse, and excellent municipal improvements. Population, 1900, 6,834.

NEW YEAR'S DAY, the first day of January and of the year. It has been observed as a religious holiday from the time of the Julian reformation of the calendar. Since it occurs on the eighth day after Christmas, it is the festival of Christ's circumcision, and as such is celebrated by various religious denominations, though in many countries it is observed more particularly with festive rejoicing and for interchanging presents. Although the Egyptians, Jews, Mohammedans, Chinese, and Romans differed from us and from each other as to the day on which the year begins, they all made it a day of special interest. It is observed more closely in religious services in European countries than in America, and in many it has been superseded by Christmas for the bestowal of gifts.

NEW YORK, one of the original thirteen states of the United States, whose boundary on the west and north is formed principally by Lakes Erie and Ontario and the Dominion of Canada; east by Vermont, Massachusetts, and Connecticut, and south by the Atlantic Ocean, New Jersey, and Pennsylvania. It is the largest of the eastern states, having an area of 49,170 square miles. Its shape is somewhat like a triangle; its boundary line is irregular, and with it is included Long Island. The surface is diversified, many portions being level or undulating plains, while others are hilly, and in the eastern part are a number of mountain groups and chains. The principal

mountains are the Adirondacks and Catskills. These highlands belong to the Appalachian system. They are separated from each other by the Mohawk valley. From Connecticut to New Jersey extend the beautiful Highlands of the Hudson. The southwestern part of the state is drained into the Mississippi system by the Allegheny River; the northeastern part into the St. Lawrence system by the Genesee, Oswego, Black, and Oswekatchie rivers; and the southeastern part by the Mohawk, Hudson, Delaware, and Susquehanna. In New York are many beautiful lakes, among them Chautauqua, Keuka, Seneca, Cayuga, Oneida, Long, Saranac, Raquette, and George. On the eastern boundary is Lake Champlain, and along the northeastern boundary flows the St. Lawrence River. Its climate is marked by extremes of cold and heat, the thermometer varying from about zero to 100°, and the average is about 48°. The rainfall averages fully forty inches, and in winter heavy snows occur. The state is noted as being one of the most healthful.

New York possesses a large per cent. of fertile soil, and originally the state was covered by vast forests. Among its most abundant species of timber are maple, elm, pine, oak, magnolia, hickory, larch, poplar, yew, locust, walnut, sycamore, chestnut, mulberry, basswood, balsam, and other northern varieties. The state possesses vast deposits of minerals and takes precedence as a great iron producer. It has long ranked first in the production of salt. There are valuable deposits of granite, limestone, gypsum, sandstone, zinc, copper, lead, and petroleum. Fully one-half of the state is under cultivation, the value of cereals aggregating annually about $40,500,000, and the production of hay about $48,500,000. Among the principal cereals are corn, oats, wheat, barley, rye, and buckwheat, and there is a large production of vegetables, hops, broom corn, tobacco, and fruits, particularly apples and grapes. The state ranks first in the number of milch cows, having 1,500,000, and there is a correspondingly large manufacture of cheese and condensed milk. Other livestock embraces horses, neat cattle, mules, sheep, swine, and poultry. Its manufactures are of vast proportions, representing a total annual value of about $2,250,000,000. The principal productions embrace spirituous liquors, tobacco products, ironware, steel plates and sheets, pig-iron, engines, cotton, woolen and silk goods, cooperage, musical instruments, furniture, paper, vehicles, ships and sailing vessels, boots and shoes, drugs and chemicals, brick and tile, farming implements, sugar and molasses, clothing, flour, metalware, and furs. Commercial enterprises are correspondingly vast, and are facilitated by a number of excellent canals. It has excellent lake, ocean, and river navigation, and a complete network of railroads, the latter including a total of 8,675 miles. The fishing industry is carried on extensively, the interior lakes making the propagation of many fresh-water varieties possible.

The educational affairs of New York are under the direction of a state board of regents and a state superintendent of public instruction, who are assisted by county school commissioners and competent supervision in towns and cities. There are 12,125 schoolhouses, and a school population of 1,950,125. Teachers' institutes are held annually in various portions of the state, at which about 22,500 persons attend. Normal schools are maintained at Fredonia, Courtland, Geneseo, Albany, Buffalo, Brockport, Potsdam, Oswego, Oneonta, Plattsburg, and New Paltz. There is a normal college in New York City, and in addition normal training is given in a number of the high schools. The state has splendid institutions for the care of unfortunates, aged, insane, blind, deaf and dumb, feeble-minded, and incorrigible. Many private and denominational hospitals, homes, and educational institutions are maintained. The leading educational institutions include Polytechnic Institute, Brooklyn; Cornell University, Ithaca; Columbia University, College of New York, University of New York, and Manhattan College, New York; Union College, Schenectady; Elmira College, Elmira; Vassar College, Poughkeepsie; Hamilton College, Clinton; Syracuse University, Syracuse; Colgate University, Hamilton; University of Rochester, Rochester; Alfred University, Alfred; Hobart College, Geneva, and Wells College, Aurora. The United States Military Academy is situated at West Point. Excellent libraries are abundant in the cities and institutions of learning. At present 2,115 periodicals are published in the state, which include 192 dailies and 1,175 weeklies.

It is thought that Giovanni Verrazano was the first European to reach the region included in New York, since he discovered New York Bay in 1524. Henry Hudson discovered the river that bears his name while employed by the Dutch East India Company, in 1609, and in the same year Samuel Champlain discovered Lake Champlain. The Dutch carried on a trade in furs with the Indians until 1614 without attempting settlements, but in that year Fort Nassau was founded, and in 1623 New Amsterdam was established, the former being the original name of Albany and the latter of New York City. Four Dutch governors ruled in the region, including Minuit, Van Twiller, Kieft, and Stuyvesant, and in 1664 the colony was captured by the English. The English were ousted for a short time, in 1673, but all the remainder of the period up to the Revolution they remained in possession. In 1690 the first colonial congress met at Albany to consider Indian troubles, and in 1700 Captain Kidd, the pirate, was captured. The first state constitution for New York was adopted

in 1777, and on July 26, 1788, the national constitution was approved. There were many tories in New York at the time of the Revolution, but the greater number of its citizens gave support to the cause of independence, as they also did in all the subsequent wars for the Union.

The state of New York ranks first in wealth and population, and takes precedence in having the greatest number of educational institutions. It is popularly known as the Empire State. Albany, on the Hudson, is its capital. There are sixty counties in the state. Forty of its cities have a population of over 10,000. The principal cities include New York, Buffalo, Rochester, Albany, Syracuse, Troy, Utica, Binghamton, Yonkers, Elmira, Long Island City, Auburn, Newburg, Cohoes, Poughkeepsie, Oswego, Kingston, Schenectady, Amsterdam, Jamestown, Lockport, Rome, Gloversville, Watertown, Middletown, Ogdensburg, Ithaca, Hornellsville, Hudson, Dunkirk, and Corning. The state is accorded a population of 7,268,012 by the census of 1900, which equals 153 persons to the square mile. There is a colored population of 112,013, or 1.5 per cent., including 99,232 Negroes, 7,170 Chinese, and 4,627 Indians. The female population is somewhat in excess, being 50.3 per cent. of the total.

NEW YORK, formerly called New Amsterdam, the largest city of America. It

BARTHOLDI'S STATUE OF LIBERTY.

ranks as the second city in the world, being exceeded in population only by London. It is situated in the state of New York, at the confluence of the Hudson and East rivers. Originally New York was situated on the island of Manhattan, a tract of land included between the Hudson and East rivers, which was purchased by Peter Minuit, director for the Dutch West India Company, from the Indians in 1626 for $24. At present the city not only covers all of this tract, but extends far beyond into the state and includes a portion of Long Island. Manhattan Island is about one and three-fourths miles wide and thirteen miles long, and south of it is New York Bay. Eighteen miles south of Manhattan Island is Sandy Hook, where a bar divides the bay from the Atlantic Ocean.

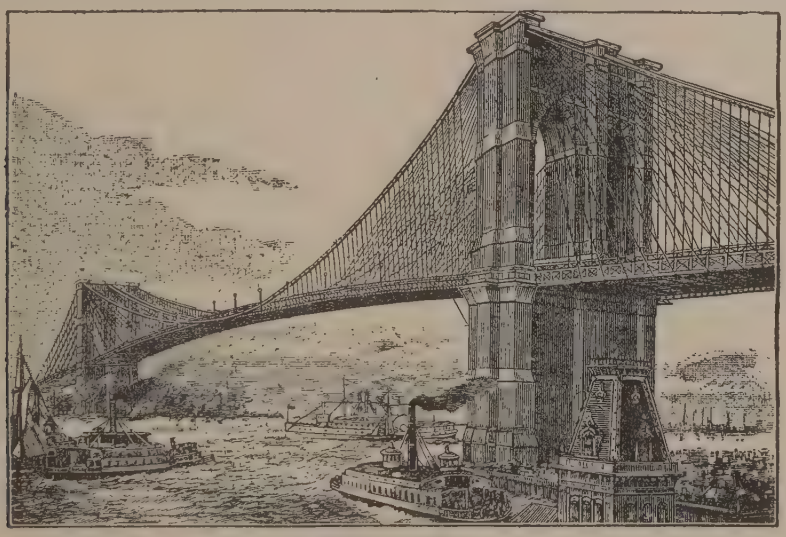
A strait called The Narrows separates Staten Island from Long Island. It is about a mile wide, and on its shores are three strong forts. This strait must be passed by all large ships that enter the inner harbor, which includes fourteen square miles, and is one of the most beautiful and secure in the world. Vessels may also enter the harbor from Long Island Sound, through the recently improved Hell Gate Pass, and from the western side of Staten Island through Kill Von Kull, but both these passages are fitted only for ships of light draught. Three small islands are situated in the harbor, these being known as Bedloe's, Governor's, and Ellis islands. The celebrated Bartholdi Statue of Liberty stands on Bedloe's island; the United States government occupies Governor's Island; and immigrants from foreign countries are now received on Ellis Island. Formerly immigrants landed at Castle Garden. Several islands are situated in East River, known as Blackwell's, Randall's, and Ward's islands, and on them are a number of charitable and other institutions under municipal authority. New York City is important because of its excellent harbor, and its convenient location for vast commercial and manufacturing enterprises. Its wharves and docks represent a vast expenditure of time and labor, and there are fully twenty-five miles of frontage in its harbor. The export and import trade covers fully one-half of the entire business in this line transacted in the United States, and as a commercial city it takes rank with the most important in the world.

The older part of the city, situated below Fourteenth Street, is the most densely populated portion, and has a number of tortuous streets. The remainder of the city is regularly platted, has wide and uniform avenues, and a number of its streets rank among the finest in the world, among them Bowery, Broadway, Wall Street, Maiden Lane, and Fifth Avenue. Its architecture is imposing and substantial, and even where formerly buildings stood that were regarded as large structures there have been reared in their places vast edifices of modern steel construction. The most conspicuous section is near City Hall Park, where there are buildings twenty-seven stories in height, having cor-

nices 336 feet above the pavement. The buildings of large proportions include the Trinity Church, American Security Building, St. Paul Building, and Pulitzer Building, the last named having a height of 375 feet. Other fine structures are the postoffice, the city hall, the produce exchange, Madison Square Garden, Hotel Waldorf-Astoria, Hoffman House, Holland House, Park Avenue Hotel, and the hotels Netherland and Savoy. There are many splendid churches and cathedrals, among them St. Patrick's Cathedral, Temple Emanuel, Trinity Church, the Protestant Cathedral of St. John the Divine, and the Reformed Lutheran Church. The last named is situated on Fifth Avenue and is regarded one of the finest architectural productions in America. The American Tract Society Building on Nassau Street has an altitude of 306 feet, and ranks as one of the most convenient office buildings. As a whole the architecture of New York presents many vast structures of great value, but these impress one with awe rather than with a sense of beauty. Not only do we find splendid buildings in New York proper, but the former city of Brooklyn, which is now a part of Greater New York, possesses churches, schools, office buildings, and institutions of various kinds of vast value and remarkable beauty.

New York City has many fine public parks and beautiful specimens of landscape gardening. Central Park is the most extensive, but there are many others of great beauty, among them Van Courtlandt Park, Bronx Park, Pelham Bay Park, Five Points Park, Jerome Park, Audubon Park, and Morning Side Park. There are many splendid monuments in commemoration of illustrious men and great events. These include Columbus Monument; Liberty Enlightening the World, on Bedloe's Island; statue of Simon Bolivar, at the entrance to Central Park; statue of Roscoe Conkling, at Madison Square; statue of "Sunset" Cox, in Astor Place; statue of Garibaldi, in Washington Square; statue of Hancock, near Central Park; statue of Ericsson, at the Battery; statue of Greeley, in City Hall Park; and statue of Thorwaldsen, at the entrance to Central Park. The Grant Tomb is situated at the summit of the Riverside Bluff, and Washington Arch is at the north entrance to Washington Square.

The city has a number of excellent bridges, representing an expenditure of many millions of dollars. Thirteen bridges cross Harlem River, several of them being used for railroad purposes. The High Bridge, Croton Aqueduct, and Washington Bridge are among the best known and most admired. The great Brooklyn Suspension Bridge crosses East River. It is 5,989 feet long, with a river span of 1,600 feet, and eighty-five feet wide. It was built at a cost of $15,000,000, and is used for carriages and railroads, and by pedestrians. The new East River bridge, on which work was commenced in 1898, is about a mile north of it. There is also a tunnel under the East River, near Blackwell's Island, and a great bridge is contemplated across the Hudson River. The city has a vast system of electric street and elevated railways, thus making it possible to travel in the great city with ease and rapidity. Its pavements are substantial, electric and gas lighting is abundant, and there is an extensive system of public waterworks. The water supply is carried to the city by the Croton Aqueduct, and the daily consumption of water averages about 300,-



BROOKLYN BRIDGE.

000,000 gallons. To insure a constant supply of water vast reservoirs have been constructed, and the supply constantly stored aggregates 75,000,000,000,000 gallons. There is an efficient fire department under a board of three commissioners. It includes sixty-five engine companies, four fire boats, 925 horses, and a number of hook and ladder companies.

New York is noted for its extensive manufactures; the annual output aggregates in value $850,000,000. There are 27,500 manufacturing establishments, which employ 450,000 persons. The manufactures embrace all classes of useful commodities, such as furniture, leather, machinery, sailing vessels, boots and shoes, hats and caps, cottons, silk and woolen goods, chemicals and drugs, soap and candles, clothing, silk, paints, gas, tobacco products, spirituous liquors, jewelry and silverware, artificial flowers, hardware, packed meats, engines, boilers, railroad cars, stone and marble work, utensils, musical instruments, and food-stuffs. The railroad business is very extensive, many important lines centering in New York. Several of the railways enter the city by viaducts, but most of them have their depots on the New Jersey shore. Boats of all kinds ply upon the canals and other waters, while steamships communicate regularly with foreign ports. Nearly a million passengers are carried daily on the elevated railway lines, and the streets are crowded at all times of the day with vast numbers of people who find employment in the city, or come there to transact business, or to make a tour for the purpose of observing its remarkable institutions and active life. The number of immigrants that land annually at the port of New York averages about 215,000, out of a total of 275,000 coming to the United States. Immigrants land at a depot on Ellis Island, where they are duly registered, and from there ferry-boats run to the Battery every forty minutes during working hours.

New York has an extensive system of public schools, all of which are under the supervision of a city superintendent, including not only New York proper but also Brooklyn and other portions annexed within recent years. The University of the City of New York was founded in 1831. It has departments of medicine, law, pedagogy, arts, and sciences, and is attended by 1,800 students. Other great institutions of learning include Barnard College, Columbia University, College of the City of New York, St. John's College, Manhattan College, St. Francis College, Normal College, and Union Theological Seminary. The libraries include many thousands of volumes, and notable among them are the Lenox and the Astor, which were combined under a provision made by Samuel J. Tilden, who left an endowment of $4,000,000 for library purposes. There are fifty-eight general and special libraries in the city, which represent a collection of vast scope and value. The city has many excellent scientific, civic, philosophical, and educational societies. It is a center of the book trade, and in it many fine periodicals are published. Associations representing all the leading religious and educational organizations of America are maintained.

The first European to land in the vicinity of New York was Juan de Verazzano, a Florentine sailor, who discovered the Bay of New York in 1524. Henry Hudson, sailing under the direction of the Dutch East India Company, explored the river that bears his name in 1609, and a number of Dutch immigrants landed on Manhattan Island in 1614. New Amsterdam was founded by these Dutch settlers in 1623, but the British conquered it in 1664 and named it New York, in honor of the duke of York. It was reconquered in 1673 and named New Orange, but in the following year it was restored to the British. The famous plot of Negro slaves to burn the city was discovered in 1741, and was followed by several executions. When the Revolutionary War began, New York was less populous than Boston or Philadelphia. It was occupied by the British from 1776 to 1783, but in the latter year was evacuated by them. From 1784 to 1797 it was the capital of the state, and from 1785 to 1790 the seat of the United States government. Its development after the Revolution was constant, growing not only in commercial importance, but gaining steadily as a center of political influence in the state, and accumulating vast wealth. The following is its population according to different census reports issued by the government: 1774, 22,861; 1800, 60,489; 1825, 166,166; 1850, 550,394; 1860, 813,669; 1870, 942,292; 1880, 1,206,590; 1890, 1,515,301; 1900, 3,437,202.

By the Greater New York law, which went into effect on Jan. 1, 1898, the counties of Richmond and Kings, Long Island City, the towns of Newton, Flushing, and Jamaica, and a part of Hempstead in Queens county were united into one great city. The metropolis thus created contains an area of 306 square miles, and is divided into the five boroughs of Manhattan, Brooklyn, the Bronx, Richmond, and Queens. It is governed by a municipal assembly of two houses, the council and aldermen. Robert A. Van Wyck was the first mayor of the new city. Seth Low was elected mayor in 1901. See **Brooklyn**.

NEW ZEALAND (zē'land), a group of islands in the South Pacific Ocean, situated southeast of Australia. It has an area of 104,471 square miles, about as large as the state of Colorado. The group consists of three separate islands, known respectively as North Island, South Island, and Stewart Island, though the latter is comparatively small. North Island has an estimated area of 44,468 square miles; South Island, 58,525 square miles, and Stewart Island, 615 square miles. Several small islands lie near the New Zealand group and are governed with

it, the whole being a colony of Great Britain. North Island is separated from South Island by Cook's Strait. It is irregular in form, has a mountainous surface, and contains a number of volcanoes, most of which are extinct. The highest peaks are Tongariro, 6,512 feet; Egmont, 8,315 feet; and Ruapehu, 9,200 feet. Its bays furnish a number of excellent harbors. South Island has a more compact form, lying as a parallelogram in a northeast and southwest direction. Its system of mountains includes several lofty peaks, among them its culminating point, Mount Cook, 13,210 feet high.

The entire group possesses an excellent climate, great fertility of soil, and valuable minerals. Its drainage is by a number of rapid-flowing rivers. On South Island are the beautiful lakes of Te Anau and Wakatipu, while on North Island is Lake Taupo and the rivers Wanganui, 125 miles long, and Waikato, 200 miles long. The minerals include productive deposits of coal, gold, silver, antimony, manganese, and lead. Fine forests abound in all portions of the islands, including such varieties as pine, gumwood, damar-pine, and others of value in manufacture. There are no large wild animals, but beautiful birds of song and plumage are very numerous. The soil is easily cultivated and yields abundantly, the principal crops being barley, wheat, oats, hemp, hay, and potatoes. Tropical and semi-tropical fruits of all kinds are produced in abundance. Much of the mountain region is utilized for pasturage, the principal live-stock being sheep, though there are also extensive interests in the breeding of cattle, horses, swine, and poultry. The exports embrace grain, wool, gold, frozen meat, butter and cheese, hides, fruits, and kauri-gum, the latter being manufactured from the damar-pine tree. There are considerable imports of manufactured articles. The railway lines aggregate 3,000 miles, nearly all of which are owned by the government, and there are fully 18,500 miles of telegraph lines.

New Zealand was discovered in 1642 by Tasman, and in 1769 it was claimed for George III. by Captain Cook. Settlements were effected by Europeans in 1814, but material advancement in colonization was not made until 1833, when it was annexed for governmental purposes to New South Wales. In 1841 it was established as a separate colony with a governor independent of Australian colonies, and a constitution was adopted in 1852. The natives of New Zealand are a Polynesian people known as Maoris, and severe wars for possession of the land occurred at various times, particularly in 1843. These natives were organized as tribes, and, though formerly numerous, they do not exceed 41,500 at present. Auckland was the capital up to 1865, but in that year the seat of government was removed to Wellington, which is the present capital.

The government is administered by a governor, who is aided by a ministry, a legislative council appointed by the crown for life, and a house of representatives whose members are elected for three years by general suffrage. It has been the policy of the government to encourage the development of industrial arts, build railroads and canals, construct harbor improvements, and support efficiently a free school system. Public schools are maintained in all cities and settlements. The colony has a number of colleges, training schools, and the University of New Zealand. The last named institution maintains advanced courses of study in law, medicine, arts, and sciences, and has an attendance of 750 students. There are 325 public libraries, containing 375,000 volumes, and about 200 periodicals. All the principal religious denominations are well represented by efficient organizations, and a number of them have done effective work among the natives for many years. The principal cities include Auckland, Christchurch, Dunedin, Wellington, Invercargill, Oamaru, and Wanganui. The total population is 825,325, of which about 630,000 are Europeans and 5,500 Chinese.

NEY (nā), **Michel**, marshal of France, born at Saar-louis, France, Jan. 10, 1769; executed in the Luxembourg Gardens, Dec. 7, 1815. He was the son of a cooper, enlisted in a regiment of hussars at Metz in 1787, and soon after the outbreak of the Revolution won rapid promotions, becoming colonel in 1794. At the battle of Altenkirchen he commanded the advance guard under Kleber, and in 1798 captured Mannheim while commanding the right wing of the army under Hoche. In 1798 he was general of division in the Rhine campaign, and Napoleon soon after appointed him inspector-general of cavalry. He became marshal of France in 1805, and gained a victory at Elchingen over the Austrians, took part in the battles of Jena and Eylau, and accompanied Napoleon on his celebrated invasion of Russia, conducting the rear guard in the retreat from Moscow. He was eminently conspicuous in the campaign of 1813, when he won a large part of the success at Lützen, and commanded in the battles at Bautzen and Dresden. When Napoleon abdicated in 1814, Ney took the oath of allegiance to Louis XVIII., and was sent at the head of an army of 4,000 men to check Napoleon on his return from Elba. However, when Ney saw his old commander he at once led the troops to Napoleon's side, and soon after opened the way to Paris. He commanded the center of the army at Waterloo, where five horses were shot under him, and after the defeat he entered Paris. When the allies captured Paris he fled to Switzerland, but he was soon after arrested as a traitor, and on Dec. 5, 1815, was convicted of high treason by the English house of peers.

NEZ PERCES (nā' pûr-sā'), or **Sahap-**

tins, an Indian tribe of North America, resident in Idaho at the time that region was first explored. They were generally friendly to the whites, and in 1854 disposed of a part of their land, but in 1877 difficulties arose about a reduction of their reservations. Soon after a number of them were transferred to Indian Territory, while others remained in Idaho or settled in Washington.

NGAMI (n'gä'mē), a lake situated in South Africa, at the northern extremity of the Kalahari Desert, and east of German Southwest Africa. It is sixteen miles wide, sixty miles long, and 2,650 feet above sea-level. The rainy season causes it to rise materially, when its water is fresh, but it becomes brackish in the dry season. It receives the water of the Teoge, and the outflow is carried by the Zouga. The existence of lakes in this region of Africa was known in the time of Herodotus, but explorations of note were not made until 1849, when Livingstone supplied authentic information regarding the natural aspect of that section of Africa.

NIAGARA (nī-ăg'ą-rą), a North American river, flowing from Lake Erie into Lake Ontario, and separating the state of New York from the province of Ontario. Its length is thirty-four miles, width from one to four miles, and it includes several islands, of which Grand Island is the largest, being about nine miles in length. The river descends 330 feet between the two lakes. It makes a narrowing about fifteen miles from Lake Erie, where the narrowed channel causes the Rapids, and below it the stream is divided by Goat Island, forming the celebrated Niagara Falls. The precipitated water rushes with such force that it is carried about forty yards from the cliff, and a narrow pathway is left between the water below and the nearly perpendicular rock. The cataract is divided into two falls. On the New York side is the American Falls, having a width of 1,120 feet and a descent of 165 feet; while the Horseshoe Falls is on the Canadian side and has a width of 2,125 feet and a descent of 150 feet. The water has a depth of about four feet at the upper part of the Falls, though in some places at the apex it is fully twenty feet, and the volume of water sweeping over the crest is estimated at 15,000,000 cubic feet per minute. It rushes with great rapidity down the channel, after leaving the precipice, for a distance of seven miles, where the sides are formed of nearly perpendicular walls of rock. There is a constant wear of the rock by the action of the water, which has gone on for ages, and the Falls are slowing receding toward Lake Erie. A great suspension bridge, which is 190 feet above the water and 1,190 feet in length, crosses the river a short distance below the Falls, and another bridge 245 feet above the water is situated two miles below Niagara Falls. The United States government controls the land immediately adjoining the Falls on the New York side, and that on the Canadian side is controlled by the British government, the purpose being to preserve the immediate vicinity of the Falls in its natural state. The Falls were first visited by Father Hennepin in 1678, and a Swedish naturalist named Kalm published the first description in 1751. It was named from an Iroquois word, meaning the Thunder of Water.

NIAGARA FALLS, a city of Niagara county, New York, twenty-two miles north of Buffalo, on the Niagara River. It has good railroad facilities, and is connected with the Canadian side by a suspension bridge, and by a bridge with Goat Island. There are manufactures of flour, paper, gas, machinery, lumber products, earthenware, cooperage, spirituous liquors, edged tools, wearing apparel, and utensils. Pavements, waterworks, electric lights, and street railways are among the improvements. It has a fine system of public schools and a number of well built churches. The city is a favorite center for sight-seers, who visit the Falls on the Niagara River. Population, 1900, 19,457.

NIBELUNGENLIED (nē-bĕl-ŭn'gĕn-lēt), a noted German epic poem dating from the Middle Ages, and constituting one of the most celebrated productions in the world's literature. It was written in the High German dialect, but its authorship is unknown, though it is generally assigned to the early part of the 13th century. It is also certain that some of the material constituting the poem originated in the 12th century, and its greatest popularity among Germans was reached in the 16th century. According to a critical analysis made by W. Grimm, it is a compilation of rhapsodies and songs that existed for many generations, all of which have been presented with a remarkable simplicity, though some of them are not connected closely in all of their parts. The story of the Nibelungenlied is to the effect that Siegfried, heir of the king of the Netherlands, came into possession of the fabled treasure of the Nibelungs, and that this constantly bore evil to its owner. He became the husband of Kriemheld, sister of the king of Worms, the celebrated Gunther. The latter was desirous of winning Brunhilde of Iceland, and Siegfried came to his assistance by substituting himself for Gunther. A dispute now arose as to whether Gunther or Siegfried was the greater, by which the jealousy of Brunhilde became aroused, and she accordingly induced Hogan, a vassal of Gunther, to murder Siegfried.

The death of Siegfried was long mourned by Kriemheld, but after some years she was married to Attila, king of the Huns. She had come into possession of the treasure of the Nibelungs after the death of Siegfried, but this was secured from her by Hogan, who succeeded in casting it into the Rhine. Kriemheld still mourned the death of Sieg-

fried, and to secure revenge invited her brother and his court to pay her a visit, which he did with 11,000 Burgundians. The poem is devoted after this to an account of a long contest that followed, in which many of the Burgundians lost their lives, and Kriemheld finally slew her brother with the sword of Siegfried, but she was herself slain by the aged warrior Hildebrand. The exact location of the Nibelungs' treasure has not been revealed, since Hogan took an oath not to give any information regarding the place, but it is still supposed to lie secure at the bottom of the Rhine. There are a number of valuable manuscripts of this poem dating from the 13th century, and many translations have been made into other languages.

NICÆA (nee-sē'a), or **Nice**, anciently an important city of Asia Minor, situated in Bithynia, on Lake Ascania. It was founded in 316 B. C. by Antigonus, who named it Antigonia, but later its name was changed to Nicæa by Lysimachus in remembrance of his wife. This interesting city was the seat of an ecumenical council under Emperor Constantine in 325 A. D., and another under Empress Irene in 787. It was made the capital of the Greek possessions by Emperor Theodorus Lascaris in 1204, remaining the seat of Greek emperors until 1261, when they recovered Constantinople from the Latins. Nicæa fell into the possession of the Turks in 1330, and has since remained a part of the Ottoman Empire. Its population is about 1,200.

NICARAGUA (nē-kä-rä'gwä), a republic of Central America, lying south of Honduras, west of the Caribbean Sea, north of Costa Rica, and east of the Pacific Ocean. It comprises thirteen provinces and has an area of 49,200 square miles. Its population is 435,000, of which about 40,000 are uncivilized Indians. The interior has a chain of mountains trending from the southeast to the northwest, and along the Pacific coast are ranges of mountains that contain many volcanic cones, some of them rising 7,000 feet above sea-level. The central chain of mountains form a great watershed, and east of it is an extensive plain. Among the principal rivers are the Bluefield, Tongula, Bracma, Corree, Cape, San Juan, Congrital, and Maiz. The coasts are indented by several extensive bays, and there are several fine lakes, the principal ones being Nicaragua, Leon, and Pearl Lagoon. The climate is varied according to differences in elevation above sea-level and proximity to the sea, though in the main it is tropical, and there is an abundance of rainfall, except at certain seasons of the year in the mountain districts.

The climate is generally favorable to the growth of cereals and in most parts to man, but in the swampy regions of the Caribbean coast it is unhealthful and malarial. There is an abundance of excellent timber, including such varieties as logwood, cedar, Brazil wood, and mahogany. The pastures are excellent. Large herds of cattle and sheep are reared, and there are considerable interests in the rearing of horses, ponies, mules, and swine. The principal crops embrace coffee, cotton, corn, sugar cane, rice, tobacco, vegetables, and many varieties of fruits. Indigo, gum-arabic, ginger, india-rubber, aloes, sarsaparilla, and copal are produced in abundance. The minerals embrace iron, gold, silver, copper, lead, granite, and limestone. Many of the natural resources are still undeveloped, and there are vast opportunities for energy and capital, the varied climate and different localities offering favorable openings for both.

The government of Nicaragua is administered under a constitution proclaimed in 1894. It is modeled after the constitution of the United States. The presidential term is four years, and the legislative functions are vested in a congress of one department, which is constituted of forty representatives, who are elected for terms of two years by popular vote. There is a national militia of 5,000 men, with a reserve force of 10,000 men. Nicaragua took an active interest in advocating the organization of the Republic of Central America, a union of the Central American countries, though this wholesome scheme did not meet with realization. Schools are maintained under government grants and taxation, but the educational affairs are still in a very backward condition. There are about 1,500 elementary schools. A number of high schools are maintained in the cities. Several institutions of higher learning have been endowed by the government. Roman Catholic is the prevailing religion and the language is Spanish.

The region included in Nicaragua was occupied by the Aztecs at the time Columbus sailed along its coast in 1502, and their civilization ranked with the highest common to their settlements. In 1522 it was conquered by Pedro Arias de Avila, the governor of Panama, and the city of Granada was founded by Spaniards in 1524. It belonged as a dependency to Guatemala from 1560 to 1821, securing its independence from Spain in the latter year. Since then it has had a number of revolutions, and in 1860 a dispute in relation to the Mosquito Coast was settled with Great Britain. Corinto is the principal seaport on the Pacific. Greytown, on the Caribbean Sea, has a large foreign trade. The export trade is chiefly with Germany; the import trade with Great Britain, and the coffee estates are largely under the ownership of German syndicates. The government maintains an efficient postoffice system. Telegraph, telephone, and several railroad lines have been built, the last named including several hundred miles. Managua, on Lake Leon, is the capital. The principal cities include Leon, Granada, Managua,

Masaya, Rivas, Nicaragua, Chinandega, and Multagalpa.

NICARAGUA, Lake of, a body of fresh water near the western coast of Nicaragua, Central America. It is from thirty to forty miles wide, 108 miles long, and 108 feet above the Pacific, from which it is separated by a low range of hills. The San Juan forms its outlet into the Caribbean Sea, and it is united with Lake Leon by the Penaloya River. It contains a number of islands, and forms the seat of considerable steamboat traffic, being on the route of the principal traffic across the isthmus. Lake Nicaragua is on the route proposed for the Nicaragua Canal.

NICARAGUA CANAL, a projected canal across Central America, which is designed to begin at Greytown, thence run

NICARAGUA CANAL.
ENGLISH MILES
NICARAGUA
Rivas
Granada
Nicaragua
Brito
San Juan del Sur
Bahia
PACIFIC
S. Elena
C. S. Elena
OCEAN
Virgen
Rivas
Lake Nicaragua
Solentiname Is.
Ometepe
Isla Ometepe
Rio Lajas
Rio Sapoa
Rio Frio
Rio Sarapiqui
Rio San Juan
Rio Colorado
Rio Serapiqui
Rio Sarapiqui
Rio Sarapiqui
Rio Sar

ment. A war with Persia was concluded in 1828, by which Russia acquired considerable territory, and other dominions were added soon after by a successful war against Turkey, peace being concluded at Adrianople in 1829. In 1830 he quashed an uprising of the Poles, and reduced Poland to a Russian province, making it his object to destroy Polish nationality. He assisted Austria in suppressing the Hungarian uprising in 1848, and in 1852 entered upon the laudable enterprise of establishing a protectorate over the Christians in Palestine. This course was opposed by Britain and France, who looked upon his design as a move to absorb Turkey, on account of which the Crimean War was brought about, but he died before it terminated. Nicholas was noted as a man of great frugality, temperance, and patriotism. He received the plaudits of all the Russians, but the losses resulting from the Crimean War caused him much anxiety and at least a partial loss of public regard.

NICHOLAS II., czar of Russia, born in St. Petersburg, May 18, 1868. His parents were Alexander III and a daughter of the king of Denmark, who provided well for his education. He succeeded to the throne at the death of his father, on Nov. 1, 1894, and on the 26th of the same month married Princess Alix of Hesse-Darmstadt. The official coronation took place on May 26, 1896, and was witnessed by representatives of nearly every government. His policy has been one of liberality from the first, giving support to vast railroad enterprises, and promoting the construction of canals, the founding of educational institutions, and the enlargement of Russian power in Asia. Being himself thoroughly trained in industrial arts, he has shown remarkable interest in all enterprises designed to substantially develop the natural resources of his vast possessions.

NICHOLAS II.

NICHOLAS, St., a saint regarded with much reverence by the Roman and Greek Catholic churches, but especially by the latter, which regards him the patron saint of the Russians. He was a native of Patara in Lycia, and became one of the early bishops of Myra. His early life and work in the Christian cause are wrapped in tradition, but it is reasonably certain that he was imprisoned by Diocletian for his devotion to reformatory work, and that he was liberated by Constantine, when he returned to Myra. Subsequently he attended the council of Nice, and shortly after died a natural death, his remains being removed to Bari, in Apulia. St. Nicholas is regarded the special patron of the young and of scholars, and some think that "Santa Claus" originated from him, the term being a corruption of his name. His feast is held on the 6th of December, when little presents and sweetmeats are given to children by a person in the appearance and costume of a bishop, after which the regular services follow. Writers commonly assign 340 as the year of his death.

NICIAS (nĭ'ci-as), a statesman and general of Athens, son of a wealthy citizen named Niceratus, and who became distinguished in the Peloponnesian War. He represented the aristocratic faction that was opposed by Pericles, and, after the death of that democratic leader, he came into prominence as an opponent of Cleon. His popularity was enhanced by victories over the Spartans, and by his capture of the island of Minoa in 427 B. C. He captured the island of Melos in 426 B. C., occupied the coasts of Locris, and about the same time defeated the Corinthians. In 415 B. C. a great naval expedition against Sicily was instigated by Alcibiades, of which Nicias was made commander, but the enterprise met with disaster, his fleet being destroyed and his army compelled to retreat to the interior of Sicily. In 413 B. C. Nicias and his troops were forced to surrender and he was executed.

NICKEL, a metallic element discovered in 1751 by Axel Frederick Cronstedt (1722-1765). It is usually found associated with cobalt. Nickel is hard, ductile, malleable, and magnetic, and has a grayish-white color. It may be alloyed with tin, copper, arsenic, and gold. In 1879 Fleitmann, a German chemist, discovered that nickel may be easily drawn and rolled when mixed with a small per cent. of magnesium. Previous to that time it had been used almost exclusively in preparing German silver, which is still its most important alloy, but it is also used in the arts as an ingredient of many alloys, including coins, and for coating the soft metals by electrolysis. Nickel was formerly produced most extensively in Germany, France, Norway, and Hungary, and is still secured there in considerable quantities, but within recent years the largest output has been in Canada, where the annual production has a value of $1,850,000. The Canadian mines are situated mostly in Ontario, and yield fully half of the world's supply. There are productive deposits at Mine La Motte, Missouri. The addition of about three per cent. of nickel to steel has been found to greatly strengthen it. Nickel-steel is now used extensively in the manufacture of high grade bicycle tubing, crank shafts, engine forging, and for armor.

NICOTINE (nĭk'ō-tĭn), a poisonous, colorless, oily liquid alkaloid obtained from the

leaves of certain plants, especially tobacco. It forms acrid and pungent salts when combined with acids. The amount contained in tobacco varies from two to eight per cent.

NIEBUHR (nee'boor), **Barthold Georg**, German historian, born in Copenhagen, Denmark, Aug. 27, 1776; died Jan. 2, 1831. He was the son of Karsten Niebuhr, a noted geographer and traveler, studied law at Göttingen, and took a philosophical course at Kiel. Subsequently he pursued the study of natural sciences at Edinburgh. He married in 1800 and located at Copenhagen, where, in 1804, he became director of the national bank. Two years later he left the Danish service to accept a similar position under the Prussian government, and also served as Prussian minister to Holland. He became professor at the University of Berlin in 1810, where he lectured on Roman history with eminent success, establishing a reputation as an original and philosophical historian. In 1816 he was made the German ambassador at the papal court, in which position he served until 1823, occupying himself at leisure times in historical research. Subsequently he settled at Bonn, where he lectured on ancient history at the university, and also pursued the writing of various treatises and publications. His principal works embrace "Roman History;" "Grecian Heroes;" "Constitution of the Netherlands;" "Lectures on Ancient History," and "History of Byzantium."

NIEMEN (nee'men), or **Memel**, a river of Europe, having its source near the city of Minsk, Russia, and after a course of 635 miles flows into the Baltic Sea, entering that body through Kurische Haff. It divides near Tilsit and forms a large delta. The Niemen is navigable to Gradno, a distance of 400 miles from its mouth. It is connected with the Dnieper and Black Sea by the Oginski Canal. After entering Germany it takes the name of Memel.

NIGER (nī'jẽr), a great river of western Africa, having its source north of the Kong Mountains. After a general course to the northeast as far as Timbuctu, it makes a bold curve and assumes a tortuous course toward the southeast, flowing into the Gulf of Guinea by an extensive delta. The natives apply various names to it in different regions, such as Mayo, Joliba, and Quorra. Its exact extent is not known definitely, the most careful estimates placing its length at 2,800 miles, and its basin at 800,000 square miles. The region where it rises is mountainous, its source being fully 3,000 feet above sea-level. After flowing about 325 miles, it reaches a region of great fertility, and in many places near Timbuktu several channels are formed that surround extensive islands, and in some places the river spreads over a large flat region. There are few tributaries of impor tance except the Benue, which rises in the upper part of French Congo, flows toward the southwest, and joins the Niger at Lokodza. The Niger delta begins about one hundred miles from the sea, at Aboh, and consists of three principal mouths known as the Nun, Mari, and Bonny. It extends fully 150 miles along the coast, and includes a vast region of mangrove forests. The existence of the Niger was known to Herodotus, who supposed it to be a tributary of the Nile, and Pliny also spoke of it in that connection. The first definite knowledge of the river was secured in 1796, when Mungo Park explored its banks for a distance of 160 miles. A railroad line is projected from the head of navigation on the Senegal, at Kai, to Timbuctu for the purpose of uniting the traffic of that river with the navigation of the Niger.

NIGERIA (nī-jē'rĭ-a), or **Niger Territories**, a vast region of West Africa, belonging to Great Britain. It is situated between the British Lagos and the German Cameroon, and stretches north from the Gulf of Guinea for about 1,000 miles. This region includes Southern Nigeria, and the territory formerly occupied by the Royal Niger Company, known as Northern Nigeria. Southern Nigeria became a British protectorate in

NIGHT HAWK.

1884, and the Niger Territories passed from the Royal Niger Company to the British in 1899. The entire region embraces about 350,000 square miles, and an estimated population of about 25,000,000. It includes a number of large interior towns and trade centers, among them Wari, Bonny, Akassa, and Kano. The trade is carried on largely by navigation on the Niger River, on which steamers may penetrate into the heart of the continent. Among the products are india-rubber, hides, ivory, gum, vegetable butter, live-stock, coffee, cocoa, and fruits; while the imports embrace cotton, silk, and woolen goods, beads, hardware, earthenware, salt, and utensils. The Fulahs are the dominant race, though there are many different classes governed under various chiefs and native kings. Old Calabar is the seat of government in Southern Nigeria. Various missionary societies are operating among the natives, and there are a number of government schools receiving public support.

NIGHT HAWK, a bird found extensively

in North America, belonging to the family of goatsuckers. It is of value for its destruction of large insects and beetles, upon which it feeds. The common night hawk is about nine inches long, measures twenty-two inches in expanse of wings, and has a slightly forked tail. Its color is brown with small spots of white on the throat and sides, and it pursues its prey in the air, principally near sunset. It often flies to a great height at twilight and suddenly rushes downward, when a sharp, rasping cry is heard. The whip-poor-will and chuck-will's-widow are species of the night hawk. These birds are migratory, leaving the northern zones in September and returning in May. In most species the flight is rapid.

NIGHTINGALE (nīt'in-gāl), a bird of song, belonging to the thrush family. The plumage of both sexes is alike, being reddish-brown above and grayish-white beneath. In most species the tail is rufous and the breast

NIGHTINGALE.

dark-hued. It is so named because it chants its beautiful song at night, but only the male is the singer, and its song ceases at the time the female has hatched its young. The nightingale is distributed extensively in Eurasia and Africa. It is particularly abundant in the western part of Europe and the countries bordering on the Mediterranean. Its nest is built on or near the ground, and in it from four to six olive-colored eggs are laid. It gathers food by searching for caterpillars, worms, ants' eggs, insects, and beetles. Among the different varieties are the true nightingale, thrush nightingale, and Indian nightingale. The redwing is often mentioned as the Swedish nightingale, and the Virginia nightingale is a species of grosbeak. In various countries the nightingales are prized as cage-birds. They have entered extensively into the literature of many civilized nations. In captivity they are short lived.

NIGHTINGALE, Florence, noted nurse, born in Florence, Italy, in May, 1820. She was the daughter of William Edward Nightingale, early manifested a desire to alleviate suffering, and in 1844 made a tour of Europe to inspect the condition of hospitals. In 1851 she began to study for the profession of a trained nurse at Kaiserswerth, Germany, where she performed with her own hands all that was then required of one intending to make nursing a science and profession. After completing a systematic course, she visited hospitals at Paris, and took charge of a sanitarium in London, where she gave unremitting attention to the management of the institution. When the war between Russia and Turkey broke out, in 1854, she concluded to proceed to the scene of contest in the Crimea, where the sanitary needs of the soldiers were most neglected. With a company of thirty trained nurses she took charge of the military hospitals at a time when the English public was frantic over the mortality resulting from neglect of the soldiers. Her work began at Scutari in 1854, and the following spring she crossed the Black Sea to Balaklava, where she reorganized the camp hospital, and at the close of the war, in 1856, returned to London. Shortly after a fund of $200,000 was raised by public subscription with which the Nightingale Home was founded, of which she was given charge. At the time of the Civil War in America she rendered valuable service by corresponding with the medical and hospital departments at Washington. During the Franco-German War she was active in the army hospitals of both Germans and French. Miss Nightingale was regarded the greatest authority on the care of the sick in her time, and was honored by many nations. Longfellow wrote "Santa Filomena" in her praise. Her writings include "Notes on Nursing;" "Notes on Hospitals;" "Life or Death in India," and "A Note of Interrogation."

NIGHTSHADE (nīt'shād), a class of plants belonging to the genus solanum nigrum, commonly reputed poisonous, and used extensively in medicines. They are weed-like plants with white flowers and black berries, and are widely distributed in all the continents and many islands. The different varieties include the black nightshade; deadly nightshade, or belladonna; woody nightshade, or bittersweet, and enchanter's nightshade, or circæa. Several species of nightshade common to Eurasia are extremely poisonous, but the varieties native to the United States are not regarded as possessed of poisonous qualities, though the leaves and berries have properties that induce sleep. The common nightshade grows to a height of about two feet. It is much branched and has white flowers and ovate leaves.

NIHILIST (nī'hĭl-ĭst), a term applied to the advocates of nihilism in Russia, that being the designation of the socialistic movement which began to form as early as 1860. It was first applied by Ivan Turgenieff (1818-1883) to the hero of his novel, "Fathers and Sons," who was made to personify a movement in Russia for the spread of greater religious and political independence. When a movement was made to free the serfs in

1860, though this was prevented by serf-owners influencing the czar, the nihilists began to conduct active educational movements, and a large number of young men and young women of the upper classes visited the fields and factories for the purpose of distributing socialistic literature and organizing societies. The object was to establish a party with vast influence in civic affairs through agitation. The rapidity with which the movement spread so alarmed the authorities that repressive measures were resorted to, and several hundred of the advocates were tried and sentenced to exile in Siberia. By 1878 the movement began to grow with renewed strength as a direct resentment of the severity of punishment, and the acquisition of political freedom was declared the first necessity. Assassinations rapidly followed and incendiary movements were widespread.

In the month of June, 1879, 3,500 fires occurred in St. Petersburg, most of them being attributed to nihilists. The assassinations included those of Generals Drenteln and Mezentzoff, Commander Heyking, and Prince Krapotkin, and on March 13, 1881, Alexander II. was assassinated near his palace by a bomb. When Alexander III. became czar of Russia, it was hoped that greater political rights would be extended to the people, including the formation of the legislative body, liberty to agitate reforms, and the adoption of a constitutional policy of government. Later the movement lost much of its vigor by the czar encouraging industrial development, but recently nihilism has again taken on new forms of life, and there are many adherents in St. Petersburg and other principal cities and towns, the membership even including a large number of the wealthy class. Nihilism as now advocated favors greater political rights and agrarian socialism.

NIJNI NOVGOROD (nĭj'nē nŏv-gō'rŏd), a city of east-central Russia, situated on the Volga River, about 250 miles east of Moscow. It is the capital of a government of the same name. The city is strongly fortified, has two cathedrals, a fine governor's palace, good schools, and is the center of a large trade in cereals and lumber. There are manufactures of machinery, leather, boots and shoes, cotton and woolen goods, spirituous liquors, tobacco, candles, and earthenware. The railroad commerce is extensive. Steamboat lines connect it by the Volga with the Caspian Sea and by canal with the Baltic. Population, 75,112.

NIKKO, a noted center of religious worship in Japan, situated about ninety miles northwest of Tokio, where it has a fine site on the Nikko Zan, meaning mountains of the sun's brightness. A Buddhist temple was established there in 767, and subsequently many temples and other institutions were founded, though the place lost much of its splendor by a destructive fire in 1861. It is now celebrated more particularly because of the many splendid sepulchers in which lie the remains of noted personages, including several shoguns of Japan. Large caravans of pilgrims wend their way to Nikko annually to worship there in the shrines of ancient splendor, or to look with feelings of satisfaction upon the statues of heroes whose achievements enter largely into the traditions and history of the Japanese.

NILE, the great river of northeastern Africa, formed at Khartoum by the junction of the Blue Nile and the White Nile, the latter being regarded the main stream, and having its source in Lake Victoria Nyanza. Its length is 4,100 miles, and the basin drained by it includes 1,425,000 square miles. It is the longest river and its basin is one of the largest in the world. A considerable portion of the northern part of German East Africa is included in the basin, this region draining into Lake Victoria Nyanza. The White Nile issues from Lake Victoria Nyanza and forms the Ripon Falls, thence passes through Lake Ibrahim Pasha and enters Lake Albert Nyanza. The Falls of Karuma and the Murchison Falls are situated in its course before reaching Lake Albert Nyanza, the latter being about 230 miles from Victoria Nyanza. From the latter lake it flows in a northerly direction to about 9° north latitude, where it receives the Bahr-el-Ghazel, and flows nearly east until it receives the Sobat River. There it again makes a bold curve and continues in a northerly course until it reaches Khartoum. After receiving the Blue Nile, a river flowing from the southeast and having a length of 950 miles, it has a northeast course to Ad Damer, where it receives the Atbara from the southeast, its last tributary, and thence has a northerly but tortuous course until it reaches the Mediterranean Sea.

There are numerous cataracts and obstructions to navigation in various portions of the Nile, and below Khartoum are six great rapids. Several of the cataracts have been overcome for navigation purposes by the construction of canals and by several deepenings of the channel. The delta of the Nile begins near Cairo, where the two branches known as Rosetta and Damietta are formed, though there are a large number of smaller channels, the most easterly entering near the Suez Canal, and the most westerly near the city of Alexandria. The Nile owes its vast water supply to the rains which fall in the tropical regions and form the extensive equatorial lakes. There is scarcely any rainfall in the greater part of the lower valley, and at certain seasons of the year evaporation reduces the water supply near its mouth to a smaller quantity than flows through its channel in the Nubian Desert. In June the water supply increases, and its greatest volume is reached in September. The rise and subsidence are equally gradual, and during the height of the flood much of

the valley of Lower Egypt and a great part of the delta are inundated, the rise at Cairo being about forty feet. These floods are of immeasurable value in stimulating plant growth in the Nile valley, since they bring great productiveness to the soil by watering and fertilizing it. Much of the valley would otherwise be barren.

The Nile has long been held sacred by the Egyptians, presumably because of its value in maintaining fertility, the god Nilus being one of their divinities. It was thought by many of the ancients that the Nile had its source in Morocco and passed underneath the ground as a subterranean stream until it reached a point in Nubia, but in the time of Nero explorations were made that indicated its source to be located far toward the south. The source of the Blue Nile was discovered in 1770 by Bruce, and much information gathered regarding the true Nile dates from 1858 and 1868, when Speke and Schweinfurth made their respective exploration tours. Livingstone operated from the south, and in 1871 reached Lake Tanganyika, which was found to drain into the Zambezi. In 1875 Stanley published authentic information that the source of the Nile is in Victoria Nyanza, but that a considerable region south of that lake drains into it. The Nile abounds with fish, including the salmon, white trout, and several species of eels. Among the wild animals common to the region of the Upper Nile are the ibis, crocodile, and hippopotamus.

NILE, Battle of the, a celebrated engagement at the mouth of the Nile, in the Bay of Aboukir, about thirteen miles northeast of Alexandria, which was fought on Aug. 1, 1798. The English fleet was commanded by Nelson and the French by Admiral De Brueys, and the result was a decided victory to the former. Napoleon landed at the bay on July 25, 1799, and defeated the Turks under Mustapha. Sir Ralph Abercrombie effected a landing there in 1801.

NILES, a city of Ohio, in Trumbull county, on the Mahoning River. The surrounding country is farming and dairying, producing large quantities of cereals, livestock, and dairy products. It is connected by several railroads, giving it considerable trade advantages, and is the seat of boiler shops, rolling mills, and machine shops. Waterworks, electric lights, and several fine school buildings are among the improvements. Population, 1900, 7,468.

NILSSON (nĭl'sŏn), **Christine**, operatic singer, born in Wexio, Sweden, Aug. 3, 1843. Her parents were peasants, and her father frequently gave musicales at fairs, at which Christine sang and played on the violin. Her singing attracted the magistrate in one of the Swedish towns in 1857, who was so impressed with her voice that he sent her to Stockholm and Paris for professional training. In 1864 she appeared successfully at Paris in Verdi's "Traviata," sang in London in 1867, and made an extensive tour of the United States in 1870-71. She was married in 1872 to M. Rouzaud, who died in 1882. In 1887 she married the Spanish count, Casa de Miranda, and soon after retired from the stage. Her voice was remarkably beautiful. Wagner's "Lohengrin" was her favorite subject, in which she appeared as Elsa.

NIMES (nēm), or **Nismes**, a city in the southern part of France, capital of the department of Gard. It is situated conveniently in a fertile region and on several railroads. The streets are largely tortuous in the older part, but in the newer portion are a number of fine streets and excellent buildings. There are manufactures of cotton textiles, silk and woolen goods, carpets, upholstery, boots and shoes, leather, clothing and machinery. Productive coal regions are in its vicinity, and it is noted as an important southern market for cocoons, silks, brandy, wine, and cereals. The city was founded by the Greeks, but later became a possession of the Romans, who built a number of great institutions that are still evidenced by many remains, among them baths, a mausoleum, and an amphitheater with a capacity for 20,000 persons. The Gauls came into possession of it after expelling the Romans, and made it one of their most important commercial centers. It belonged to various sovereigns until 1252, when it became a part of France. Nimes was a stronghold of Calvinism in the 6th century, but after the revocation of the Edict of Nantes it began to decline rapidly, and not until after the Revolution were its industries reëstablished. Population, 73,060.

NINEVEH (nĭn'ē-vę), an ancient city of Asia, celebrated as the capital of the Assyrian Empire. It was situated on the east side of the Tigris River, opposite the present town of Mosul. Nimrod, a descendant of Ham, is mentioned in the Scriptures as the founder of Nineveh. On many of its monuments it is called Nina, being so named from Ninus, a name sometimes applied to Nimrod. Most of our knowledge of this city comes from classical writers, some of whom have described it as occupying an extensive site along the river and as having a circumference of sixty miles. It was inclosed by walls one hundred feet high. Among its structures were 1,500 towers 200 feet high. The wall surrounding it was finished in such a manner that three chariots abreast could be driven upon it with convenience. The Book of Jonah mentions it as an "exceeding great city of three days' journey." It remained the capital of Assyria until the fall of that empire, about 625 B. C., when it was destroyed by the allied armies of the Babylonians under Nabopalassar and the Medes under Cyaxares.

The Grecian historian, Herodotus, visited

the vicinity of Nineveh about 430 B. C., and found there nothing but ruins, but from his writings we learn much of its extent, location, and its former greatness. In 1841 explorations and excavations were begun by Bernard Cotta (1808-1879), who brought to light a number of monuments and libraries, and in 1845 Sir Henry Layard made a careful investigation of its site and many of its ruins. About that time the palaces of Sennacherib, Esarhaddon, and Assurbanipal were uncovered, and its history was unfolded at least partly by the discovery of additional libraries and many cuneiform inscriptions. Vast explorations have since been carried on under the auspices of European and American archæological societies, and many relics of great historical value are now deposited in the museums of New York, London, Berlin, Paris, and other cities. It is reasonably certain that Nineveh was not only the center of Assyrian art and culture, but that it was one of many great cities. Its monuments and remains still traceable give conclusive evidence that the city had not only strong military structures, but fine educational institutions, palaces, temples, gardens, and extensive manufactures and trade.

NINGPO (nĭng-pō′), a large city of eastern China, situated in the province of Cheh-Kiang, on the Ningpo River, about fifteen miles from the Eastern Sea. A wall twenty-five feet high and fifteen feet wide surrounds the city, through which entrance is effected by six gates. The city was thrown open to foreign commerce in 1842, since which time it has developed a large trade. There are manufactures of furniture, cotton and silk goods, straw hats, whitewood carvings, carpets, and toys. It contains a number of substantial government buildings, has well paved streets, and gives evidence of great wealth and luxury. Its temples are among the most excellent in China, and it contains the celebrated Ningpo Pagoda, a seven-storied hexagonal tower 160 feet high. Population, 255,500.

NIOBE (nī′ō-bē), a personage mentioned in Greek mythology as the daughter of Tantalus and the wife of Amphion, king of Thebes, and that she incurred the displeasure of Apollo. The story relates that Niobe was the proud mother of six sons and six daughters, and that she took pride in speaking of the number of her children. On one occasion she ridiculed the worship of Leto because she had but one son and one daughter, and accordingly wanted the Thebans to give her the honors and sacrifices formerly offered to Leto, the mother of Apollo and Artemis. These two deities became displeased, and accordingly Artemis slew all her daughters and Apollo all her sons, the last one being the youngest and best beloved, whom Niobe clasped in her arms and implored the enraged deities to spare her life, but the deadly arrow also reached the heart of this child. The unhappy father destroyed himself, while Niobe sat broken-hearted among her dead, shedding tears, and was transformed by the gods into a stone, which still continues to

NIOBE.

shed tears. The punishment of Niobe forms the subject of a magnificent marble group found in 1553, which is now in the gallery at Florence.

NIPPON, or **Niphon**. See **Japan**.

NIPIGON (nĭp′ĭ-gŏn), or **Nepigon**, a lake of Canada, situated in Ontario, twenty-eight miles north of Lake Superior, with which it is connected by the Nipigon River. Its length is sixty-eight miles and its breadth from fifteen to forty miles, and it contains a number of bays, and islands. In several places are rocky headlands. The region has fine forests. There are valuable fisheries in the lake.

NITER. See **Saltpeter**.

NITRIC ACID (nī′trĭk), a compound formed by oxygen with nitrogen, the most important of the five formed from these two elements. Nitric acid is a colorless liquid. It is partially decomposed by the prolonged action of light, and is very volatile. Its vapor condenses the moisture in the air, producing white fumes. It is very corrosive, staining the skin yellow, is disagreeable to the smell, and attacks many of the metals with great energy. It freezes at 40° below zero, boils at 184°, and while boiling is partially decomposed so that the boiling point rises about one-third higher. When the hydrogen of nitric acid is replaced by metal, nitrates are formed. The nitric acid and the nitrates of commerce are manufactured from nitrates which are found in some soils,

particularly in Chile, Egypt, and India, the deposits of Chile embracing an abundance of sodium nitrate. Gun-cotton is manufactured by adding nitric acid to cotton. It is used extensively as a powerful oxidizer of metals, such as silver, copper, tin, and many others, the oxidization taking place at the expense of the acid. It is employed in medicine in various forms as a tonic, for the removal of ulcers and warts, as a vapor to destroy contagion, and for affection of the liver. In the arts it is used for etching on copper or steel, in assaying and metallurgy, and in the preparation of dyes by forming a mordant of it and tin.

NITROGEN (nī'trō-jĕn), a chemical element forming by volume 79 per cent. and by weight 77 per cent. of our atmosphere, and which is a tasteless, odorless, and colorless elementary gas. It is a common constituent of plant tissue and enters into the various tissues of the body, though pure nitrogen is incapable of sustaining combustion or animal existence, but it possesses no positively poisonous properties. Its characteristic properties are negative, serving mainly to dilute and moderate the activity of the oxygen, with which it is associated in atmospheric air. The existence of nitrogen in the atmosphere was discovered by Rutherford in 1772. It was long regarded permanent or incondensible, but Cailletet liquefied it in 1877 by reducing it to a very low temperature and applying a vast pressure. Nitrogen is considerably lighter than oxygen, hence a given bulk of nitrogen is lighter than an equal bulk of atmospheric air. However, air is not a compound, but a mixture, and hundreds of analyses have demonstrated that the proportions of the constituents are nearly constant, the proportion of nitrogen in one hundred volumes of unconfined air varying only from 79 to 79.14 per cent. While four-fifths of the volume of the atmosphere consists of nitrogen, niter contains only 13 per cent., nitric acid about 22 per cent. by weight, and water at ordinary temperature only 1½ per cent.

The exact economic value of nitrogen in the atmosphere is still largely unknown, since it is not susceptible of being taken up directly by plants and utilized in their synthesis of nitrogenous compounds, and it takes no active part in the processes of combustion and of animal respiration. It is thought that atmospheric nitrogen contributes indirectly to the formation of nitrogenous organic matter, and also promotes further utility by diluting the oxygen, it being impossible for animal life to subsist for any considerable length of time in pure oxygen, and no substitute for nitrogen to supply this necessary function is known. Animals secure the necessary supply of nitrogen by breathing atmospheric air, and plants are thought to obtain a portion of their supply from compounds existing in the soil, and a part by aërial absorption through the leaves. There are five compounds of nitrogen, these embracing ammonia, nitrates, cyanides, nitro-compounds, and organic nitrogen compounds.

NITRO-GLYCERINE (nī-trō-glĭs'ĕr-ĭn), a light-yellow, oily liquid used as an explosive, and formed by combining concentrated nitric acid and sulphuric acid with glycerine at a low temperature. It was discovered by A. Sobrero, an Italian chemist, in 1847, and was at first used by itself, but the danger of its explosion by percussion led to the introduction of that class of dynamite compounds in which nitro-glycerine is combined with a dope or infusorial earth. If poured in the liquid form into water equaling about fifteen times its bulk, the heavy nitro-glycerine sinks to the bottom. When struck violently, it explodes with great force. The energy of the explosion is due to the energy of motion of the atoms in a molecule of nitro-glycerine, the explosion resulting directly from the nitro-glycerine being resolved into carbon dioxide, water, and nitrogen. An explosion may be effected by heating the nitro-glycerine to about 500° Fahr., when in a liquid state, but the most convenient way is to apply a red-hot iron or an electric spark. The explosive force varies according to the degree of purity, but in a pure form it is about thirteen times more powerful than an equal volume of gunpowder, and the gases produced equal about 10,000 times the bulk of nitro-glycerine used. When mixed with dope, it is made into cartridges, which are exploded by a fuse and detonating cap, and in that form it is known by various names, according to the constituency of the compound, the common forms being fulminating oil, nitro-glycerol, glonoin, glyceryl nitrate, nitroleum, blasting compound, trinitrin, and trinitro-glycerine. Nitro-glycerine is also used in various compounds for medicine, particularly in treating diseases of the digestive organs and the heart.

NOAH, a patriarch mentioned in the Book of Genesis, son of Lamech. He was chosen by God for his righteousness and godliness to become the father of the generations who should people the earth after the deluge. God informed him that the deluge would sweep all animal life to destruction on account of man's wickedness, and instructed him to build an ark in which his family and animals of all species should be saved. Accordingly Noah built the ark, and while doing so preached the duty of repentance to his erring neighbors, and, when it was completed, his family and a pair of all kinds of animals entered for protection during the flood. All living beings not protected in the ark were destroyed, and, after the waters subsided, the ark landed safely on Mount Ararat in Armenia. Noah and all beings in the ark were safely preserved, and he offered thanks to God, who gave a covenant that a deluge should never again destroy the earth, and the rainbow was given as the sign of the

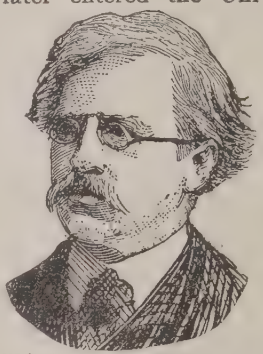
covenant. Noah died 350 years after the flood, being at that time 950 years old. The account of the deluge as recorded in the Bible is evidenced by traditions common among other nations.

NODE, a term used in mathematics to designate a point where a curve cuts itself, and through which more than one tangent to the curve can be drawn. The term is used in astronomy to indicate either of the two points at which the intersection of the planes of two orbits pierce the celestial sphere, especially those of a satellite and its primary. The node encountered by a heavenly body in its northward passage is called its ascending node, and in its southward passage it is termed the descending node. A straight line joining the nodes is termed the line of the node. The sun is in its ascending node at the vernal equinox, and in its descending node at the autumnal equinox. The points at which the orbit of the moon cuts the ecliptic are known as the lunar nodes.

NOME, a city of Alaska, on the shore of Bering Sea, near Cape Nome. It is situated about 150 miles southeast of Cape Prince of Wales and eighty miles from Golofnin Bay. The shore is bordered by low tundra and marshland, and between it and the sea is a low sandy beach. In 1900 gold was discovered near the city of Nome, causing many gold-seekers to locate there for the summer, and before the end of the year $18,000,000 worth of gold was found. The region has since been productive of the precious metal, causing a rapid increase in the population of the northern district of Alaska. However, the climate is very severe, and the ground is frozen nearly the entire year. There are several schools and churches, and it is the seat of a federal court. Population, 1900, 12,486.

NORDAU (nor-dow'), **Max Simon**, physician and author, born in Budapest, Hungary, July 29, 1849. He descended from Jewish parents, and studied medicine in Budapest, where he also entered upon the practice of medicine in 1873. In 1878 he made an extended tour of Europe, visiting Paris and other large cities, and soon after became a contributor to various periodicals. Subsequently he published several criticisms on literature, civics, and sociology, and in 1885 wrote his celebrated "Paradoxes," a philosophical study widely translated. Subsequently his well known work entitled "Degeneration" appeared, which was translated soon after into English. It is devoted to an investigation of the degeneration from intellectual activity and excitement of the half century ending in 1885, which he alleged brought on the emotional sentimentality and impurity manifest in many quarters of European society.

NORDENSKJOLD (nor'den-shöld), **Nils Adolf Erik, Baron**, Swedish naturalist and explorer, born in Helsingfors, Finland, Nov. 18, 1832; died Aug. 12, 1901. He studied in Borgo, took a course in the University of Helsingfors, and later entered the University of Berlin. During vacations he studied the natural history of Finland. Later he settled in Sweden, whence he accompanied Torell on his Arctic expedition to Spitzbergen, and subsequently made several other voyages to the polar sea. In 1869 he explored the region from the Kara Sea to the Yenisei, in Siberia, and soon after turned his attention to finding a northwest passage to the Pacific from the Atlantic. In this enterprise he was aided by the king of Sweden and others. Sailing in the Vega in July, 1878, he doubled Cape Tchelyuskin, the northern point of Eurasia, and on Sept. 2, 1879, reached Japan by way of Bering Strait. The king of Sweden created him a baron in recognition of his services, and he was also substantially honored by Germany and other countries. He wrote "Voyage of the Vega Around Asia and Europe."



NILS ADOLF NORDENSKJOLD.

NORFOLK (nôr'fok), an important city of Virginia, in Norfolk county, on the Elizabeth River. It is a port of entry, taking rank as the principal seaport of Virginia, and is well connected by a number of important railroads. The city is located on a rather low site, but has wide, though irregular, streets. It has a fine public school system, a number of splendid churches, and an excellent harbor. The municipal facilities are modern, including street pavements, several public buildings, city waterworks, public lighting, street railways, and several institutions of higher learning. Its manufactures embrace cotton and woolen goods, canned and cured fish, machinery, vehicles, boots and shoes, and utensils. It is an important market for cotton, oysters, fish, vegetables, and early fruits, and is connected with New York and other cities by a number of steamboat lines. The British burned the city in 1776, and the battle between the Monitor and Virginia was fought there. Population, 1900, 46,624.

NORMAL SCHOOL, an institution designed for training students to become teachers, in which the theory and practice of the teacher's profession is taught. The first normal schools were established in Germany, from which other European nations patterned, and institutions of this kind are now supported in every civilized country. The normal schools of the United States are modeled largely after those established in Massachusetts under the direction

of Horace Mann. All the states now maintain one or more normal schools, and in addition there are provisions in a number of states for giving normal training in various high schools and in teachers' institutes (q. v.), though the latter are designed more particularly for inspirational purposes. The normal school system is so efficiently organized in the United States that teachers with normal training are given preference in many states when positions are to be filled, and the preparation is graded from the kindergarten branches to the work contained in the courses of high schools and normal colleges. At present the students in the normal schools of the United States include about 36,500, of which about one-fourth are male students. The age of those in attendance is generally between seventeen and twenty years. Besides public normal schools, there are a large number of private schools and public high schools in which normal training is given.

NORMANS, the name applied to the descendants of the Northmen. The Normans came from Scandinavia and founded colonies in Gaul at an early date in the history of western Europe. They settled chiefly in northern France, where they gave name to the ancient province of Normandy, which is now formed into the departments of Calvados, Eure, Manche, Orne, and Seine-Inferieure. This region passed from the Romans to the Franks. In the 10th century it was conquered by the Normans, and their chief, Rollo, assumed the title of duke of Normandy. Later they conquered England, which they annexed to Normandy in 1066, and, after becoming separated, Normandy was conquered by the French in 1203. Other settlements made by the Normans were in Italy and Sicily, where Norman princes ruled in the 11th and 12th centuries.

NORNS, the three fates of Scandinavian mythology, representing the past, the present, and the future. The Norns are represented in literature as three maids, who decree irrevocably the destinies of man. They are named respectively Urd, Verdandi, and Skuld.

NORRISTOWN (nŏr'ĭs-town), a city of Pennsylvania, county seat of Montgomery county, on the Schuylkill River, sixteen miles northwest of Philadelphia. In its vicinity are productive iron mines and quarries of marble, sandstone, and limestone. It has manufactures of glass, cotton and woolen goods, ironware, oil, flour, hardware, and machinery. The city is supplied with fine pavements, waterworks, electric lighting, street railways, and good schools. It is the seat of a hospital for the insane and a music hall, and has a fine courthouse and jail. Population, 1900, 22,265.

NORTH, Frederick, Lord, earl of Guilford, prime minister of England, born April 13, 1733; died Aug. 5, 1792. He was educated at Eton and Oxford, made a tour of continental Europe soon after graduation, and in 1754 secured an election to the house of commons. In 1759 he became lord of the treasury, and in 1765 advocated the stamp act and maintained the right of England to tax the colonies in America. He was chancellor of the exchequer and leader of the house of commons in 1767, and from 1770 to 1783 served as first lord of the treasury and prime minister of England. The policy of George III. for the coercion of the colonies met his approval, and his insistence finally led to the Declaration of Independence in America on July 4, 1776. As head of the government, he managed the war against America, and, after the defeat at Yorktown, he resigned, since the failure of the king's efforts became manifest. His father died in 1790, when he became earl of Guilford.

NORTH, John Thomas, financier, born in Leeds, England, Jan. 30, 1842; died in London, May 5, 1896. He was the son of a coal merchant, was apprenticed to a millwright in 1857, and later became foreman of the Fowler Locomotive Works at Leeds. He emigrated to Chile after the death of his father, and there engaged in speculations in guano and nitrate of soda, in the province of Tarapaca. In 1889 he returned to England with a fortune valued at $100,000,000, all of which he acquired by various enterprises during an absence of twenty years, and became noted as a lavish entertainer and owner of fast horses. He gave liberal endowments to the Yorkshire College of Science and the Leeds Infirmary. In 1885 he contested as a conservative for a seat in parliament, but was defeated by Herbert Gladstone. His death occurred suddenly while presiding as chairman of a business meeting.

NORTH ADAMS, a city of Berkshire county, Massachusetts, on the Hoosac River. It is connected by several railroads, has excellent municipal facilities, and a public library with 20,000 volumes. There are manufactures of boots and shoes, cotton and woolen goods, ironware, machinery, and earthenware. It has extensive street railways, waterworks, pavements, sewerage, and fine public schools. Population, 1900, 24,200.

NORTH AMERICA. See **America**.

NORTHAMPTON (nôrth-ămp'ton), a city in Massachusetts, county seat of Hampshire county, seventeen miles north of Springfield, on the Connecticut River. It is connected with Hadley by a bridge 1,230 feet long. Northampton is the center of several converging railroads, has electric lighting and street railways, good schools, a number of fine churches, and a public library of 18,000 volumes. It is the seat of Smith College, the state lunatic asylum, and Clark Institution for Deaf Mutes, and has a fine memorial hall. There are manufactures of hair brushes, cotton textiles, silk and woolen goods, stoves, wire, paper, sewing machines,

baskets, and machinery. Its buildings include a fine county courthouse. Population, 1900, 18,143.

NORTHAMPTON, a railroad and manufacturing city of England, located in Northamptonshire, sixty miles northwest of London. It is surrounded by a productive agricultural and stock-raising country. There are important manufactures of boots and shoes, spirituous liquors, flour, paper, leather, metal goods, and machinery. It contains a number of fine churches, several excellent educational institutions, and divers hospitals and asylums. Among its improvements are waterworks, pavements, and street railways. Population, 62,230.

NORTH ATTLEBORO (ăt'tl-bŭr-rō), a town of Massachusetts, in Bristol county, thirty miles southwest of Boston. It is conveniently connected by railways, has good schools, a public library, and manufactures of jewelry, machinery, and utensils. The surrounding country is fertile. Population, 1900, 7,253.

NORTH CAPE, the most northern point of Europe, forming a rocky promontory on the island of Magero, which is separated from Norway by a narrow channel. The point forming the extreme northern projection of the continent of Europe is a few miles south and forty-five miles east of North Cape, and is called Cape Nordkyn.

NORTH CAROLINA, one of the original thirteen states of the United States, bounded on the north by Virginia, east by the Atlantic Ocean, south by Georgia and South Carolina, and west by Tennessee. Its length from east to west is 500 miles, width from twenty to 200 miles, and area 52,250 square miles, being exactly the same as the area of Alabama. In the western part the state is crossed by the Appalachian Mountains, which form the natural boundary between it and Tennessee; the mountain chains in North Carolina being the Great Smoky and Blue Ridge. The state contains the highest mountains east of the Mississippi River, the culminating peak being Mitchell's Peak, height 6,710 feet. Its drainage is chiefly to the southeast, the general surface sloping in that direction, and forming along the Atlantic an extensive plain, with a coast line of about 300 miles. Among the principal rivers are the Roanoke, Cape Fear, Neuse, Yadkin, Catawba, Tar, and Chowan. The coast line is indented by several important inlets, Albemarle Sound and Pamlico Sound being the most extensive. Cape Hatteras, Cape Lookout, and Cape Fear are the principal eastern points. The state has a variety of climates, owing to differences in altitude, being sub-tropical along the coast and temperate in the western part. In the coast region is a rainfall of sixty inches and in the interior about forty-five inches. The climate is generally healthful and equable.

North Carolina is rich in minerals, having extensive deposits of granite, sandstone, limestone, iron, coal, copper, gold, silver, and mica. The output of iron is the most valuable, and next in rank are gold, silver, and granite. Agriculture is an important industry, the principal crops embracing cotton, corn, oats, wheat, rye, buckwheat, tobacco, barley, vegetables, and fruits. There is a considerable production of hay and flax. Stock raising is a growing industry, especially that of mules, cattle, horses, and swine. The total farm acreage is 22,750,000. There are extensive manufactures of tobacco and cigars, lumber products, cotton goods, machinery, spirituous liquors, and utensils. The state has a large acreage of fine forests, and the increasing demand for lumber is leading to an enlargement of the market for its lumber products. Originally the state was covered with timber, and there is fully two-thirds of this still in existence. The varieties include magnolia, oak, ash, maple, pine, cedar, hickory, sycamore, cherry, walnut, holly, birch, and many others. The fisheries off the coasts and in the rivers are important; the annual product represents a considerable profit to several thousand people. Railroad lines are abundant, the total being 3,850 miles. There are also transportation facilities by canals, rivers, and coastal waters, equaling fully 1,000 miles.

The state maintains a system of public instruction by general taxation, the daily attendance being 412,500. High schools are maintained in the towns and cities, and there are many private institutions of higher learning. The state university is located at Chapel Hill, where it was established by charter in 1789, and at that time received as an endowment 20,000 acres of land in Tennessee. It maintains departments of philosophy, literature, arts, law, agriculture, and sciences. The university library contains 40,000 volumes. It is attended by about 600 students. Normal schools are maintained at Greensboro and Cullowhee for whites, and at Salisbury, Franklinton, Fayetteville, Elizabeth City, and several other places for colored students. There are also adequate institutions for unfortunates, incorrigibles, blind, deaf mutes, feeble-minded, and insane. The leading denominational and private schools include Trinity College, Durham; Lenoir College, Hickory; Biddle University, Charlotte; Shaw University, Raleigh; Catawba College, Newton; North Carolina College, Mount Pleasant, and Guilford College, Guilford College. All the principal religious denominations have societies in the state, the total number of buildings being 6,450. There are 275 periodicals, including twenty-five dailies and 200 weeklies.

North Carolina was first settled in 1584, when Walter Raleigh landed an expedition on Roanoke Island, but this colony did not prove successful. In 1653 the first permanent settlement was founded at Albemarle

by Roger Greene, who came there with Virginian dissenters. Another settlement was made on the Cape Fear River by New Englanders in 1660, but these left soon after. Other settlements rapidly followed and proved more successful, and in 1729 North Carolina became a royal province. The settlers were among the first to protest against arbitrary legislation on the part of England, and on May 20, 1775, the inhabitants of Mecklenburg county met at Charlotte and there adopted the Mecklenburg Declaration of Independence. The first state constitution was made in 1776, and the federal constitution was ratified on Nov. 21, 1789, this being the last state to ratify that document. The state passed articles of secession in 1861, and at various times in the Civil War was the seat of engagements, the principal one being the battle of Fort Fisher in 1865. Since the Civil War it has developed rapidly. Its natural resources are open to a still further enhancement of value. The popular name is Old North State. Raleigh is the capital. Other cities of importance include Wilmington, Charlotte, Asheville, Winston, Newbern, Durham, and Concord. The state is divided into ninety-six counties. The population, according to the census of 1900, is 1,893,810. This includes a colored population of 630,207, or 33.3 per cent., of which 5,747 are Indians and 624,469 are Negroes.

NORTH DAKOTA (dą-kō'tą), a north-central state of the United States, bounded on the north by Canada, east by Minnesota, south by South Dakota, and west by Montana. Its length from east to west is 360 miles; breadth, 212 miles, and area, 70,795 square miles, being somewhat larger than the combined areas of Washington and Rhode Island. The surface consists almost entirely of an undulating prairie, the highest elevations being those of the Turtle Mountains, that extend into the state from Manitoba, and whose highest peaks are about 2,300 feet. The greater portion of the state slopes toward the southeast, but the northeastern part slopes and is drained toward the northeast. Among the principal rivers of the Mississippi system are the Missouri, Little Missouri, James, Heart, Knife, and Cannonball; and those of the northeastern part of the state include the Red River of the North, Gluce, Sheyenne, and Mouse. The only lake of large extent is Devil's Lake, situated in the northeastern part of the state, and which has no outlet to the sea. Its geological formations bear evidence of its having been several times submerged, and there are vast alluvial and glacial drifts in many parts. The winters are cold, but, owing to the dry climate, they are sunny and pleasant, while the summers are warm. All seasons of the year are remarkably healthful. There is sufficient rainfall for the germination and maturity of crops, though the supply is somewhat limited.

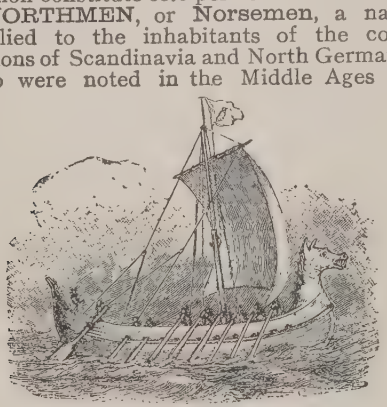
North Dakota is principally agricultural and stock-raising, but mining is beginning to receive considerable attention. The principal agricultural crops include wheat, annual value $28,250,000; oats, $4,130,000, and hay, $2,750,000. There is also a considerable production of potatoes, early corn, rye, hops, garden vegetables, and small fruits. The live-stock comprises milk cows, other cattle, horses, sheep, swine, and mules. Coal is the principal mineral, and is mined most largely along the Mouse and Missouri rivers, but there are also considerable deposits of valuable fire and brick clay, limestone, salt, and sandstone. The principal manufactures embrace butter and cheese, flour, packed meats, earthenware, spirituous liquors, and machinery. More or less timber is found along the rivers, the principal forests being along the Missouri and Mouse rivers. Railroad building is receiving growing attention, since the settlement and development of its resources depend largely upon railroad communication, and there are at present 3,250 miles of railway in the state.

The educational system of North Dakota is well organized, elementary and high schools being maintained by general taxation and an endowment created from the sale of government lands. It has two normal training schools, and in addition normal instruction is given in several high schools and colleges. The school for the deaf is situated at Devil's Lake, the state hospital for the insane at Jamestown, the state prison at Bismarck, the soldiers' home at Lisbon, and the institution for the blind at Bathgate. Its state university is at Grand Forks, and there are colleges at Jamestown, Bismarck, Fargo, Tower City, and several other places. The state maintains all the necessary benevolent and reformatory institutions, and besides them has a number of private and denominational schools. All the principal church organizations maintain churches, the different sects being represented numerically in the following order: Lutherans, Methodists, Catholics. Presbyterians, Baptists, Episcopalians, etc. There are 160 periodicals, of which ten are dailies and 140 weeklies.

The region included in North Dakota was acquired by the United States in 1803 by the Louisiana Purchase. The first permanent settlement was made by French-Canadians near Pembina in 1807, and Lord Selkirk built a fort at that place in 1812, supposing, however, that the region belonged to the English. It was at different times a part of the territories of Missouri, Michigan, Wisconsin, Iowa, and Minnesota, and in 1861 it was organized with South Dakota as the territory of Dakota, the name being derived from a tribe of Indians. It was admitted as a state on Nov. 2, 1889, after being separated from the region organized as South Dakota. The capital was at Yankton until 1883, when it was moved to Bismarck, which city is its present capital. It is popularly

called the Flickertail State. The principal cities include Fargo, Grafton, Grand Forks, Dickinson, Wahpeton, Bismarck, and Jamestown. The population of the state in 1900 was 319,146, including a colored population of 7,434, or 2.3 per cent. Of this number thirty-two are Chinese, 148 Japanese, 286 Negroes, and 6,968 Indians. The male population constitute 55.6 per cent.

NORTHMEN, or **Norsemen**, a name applied to the inhabitants of the coast regions of Scandinavia and North Germany, who were noted in the Middle Ages for



VESSEL OF THE VIKINGS.

their skill in navigating the sea. Their object in sailing was principally to secure profit from ravaging the coasts of other lands and to capture the vessels of other nations while at sea, for which purpose they fitted out many substantial fleets, and manned them with the most efficient of their young men. They became known as the sea-kings, or vikings, were warlike, and carried their marauding expeditions to regions far remote. According to the inheritance laws of Scandinavian countries, the fortunes of noblemen passed to the elder sons, hence the younger sons depended upon their success in resorting to a military life, and these continually recruited the vikings, who were otherwise of the lower rank. These peoples worshiped the gods Thor and Odin, and as a consequence had no regard for the institutions of the people advanced in civilization. They accordingly found it congenial to prey upon monasteries, cathedrals, mosques, capitols, and all the institutions of civilized life.

After the 9th century the Northmen began to dream of conquest, for which purpose they visited the Hebrides and the coasts of France and Spain. The duke of Rollo secured from the French king, Charles the Simple, a cession of the region known as Normandy in 912, which was afterward organized into a powerful state and was the seat of influence by the Normans. In 1066 the Normans conquered England, and their leader assumed the title of William the Conqueror. Later they adopted the language and religion of the French. The Northmen were not only powerful in making themselves felt in western Europe, but crossed over to Iceland and Greenland, where they formed permanent settlements and maintained a government for centuries before America was discovered. In 986 Bjarne Herjulfson sailed from Europe for Iceland, but a storm caused him to be carried out of his course, and he landed in the region now occupied by Massachusetts, which he named Vinland. In the year 1001 Lief Ericsson landed on the shores of Newfoundland and Nova Scotia, which he named Heluland and Markland, meaning respectively Stoneland and Woodland. Later attempts were made to colonize the northeastern region of North America, for which purpose an Icelandic Northman named Thorfinn Karlsefne sailed from Greenland in 1007 with 160 men for Vinland, but it is thought that the expedition was lost at sea. See **Normans**.

NORTH SEA, or **German Ocean**, a great inlet from the Atlantic Ocean, on the north coast of Europe, extending between Norway, Sweden, and Denmark on the east; Germany, the Netherlands, and Belgium on the south; and Great Britain and the Shetland Islands on the west. Its extent from north to south, from the Shetland Islands to the Strait of Dover, is about 650 miles; its width is about 400 miles, and the area includes a surface of fully 150,000 square miles. The deepest portion of the sea is along the shore of Norway, where it is about 200 fathoms, but most of the sea is quite shallow, having an average depth of about thirty-five fathoms. The North Sea is the seat of a vast commerce, and on its shores are some of the most noted commercial cities of the world, including Hull, London, Hamburg, Bremen, Edinburgh, Amsterdam, The Hague, and others, all of which have a location on its shores or are connected with it through extensive canal improvements. The fisheries yield vast products of cod, herring, haddock, ling, flat-fish, and others. It receives the waters from the Scheldt, Rhine, Weser, Forth, Thames, Tweed, Tyne, Humber, Ouse, Tay, and Elbe, this inflow rendering its waters less salty than most of the larger seas. It has many important inlets, and is connected with the Atlantic Ocean by the Strait of Dover and the English Channel, and with the Baltic Sea by the Skager Rack, Cattegat, and The Sound.

NORTH TONAWANDA, a city of New York, in Niagara county, on the Niagara River, about twelve miles north of Buffalo. It has railroad and steamboat conveniences, is surrounded by a fertile country, and has a considerable trade in merchandise. Electric railways, waterworks, pavements, and sewerage are among the improvements. Among its buildings are several fine schools and churches. Population, 1900, 9,069.

NORTHUMBERLAND (nôr-thŭm'ber-land), the name formerly applied to a kingdom of Britain, but now to a maritime county in the northern part of England. The kingdom of Northumberland was

founded by an Anglican chief named Ida in 547, when it extended from the Forth to the Tyne, and on its progress from the 6th to the middle of the 8th century depended largely the subsequent development of Anglo-Saxon history. The kingdom of Deira, a region between the Tees and the Humber, was added in 560, and under the descendants of Egbert of Wessex the gradual union of England took place, this movement occurring between the close of the 8th century and the Norman conquest.

NORTHWEST TERRITORIES, the name applied to a large part of British North America, including all the region outside of Quebec, Ontario, Manitoba, British Columbia, New Brunswick, Nova Scotia, and the province of Newfoundland. It includes an area estimated at 2,330,840 square miles, and embraces the following administrative districts: Keewatin, 756,000 square miles; Athabasca, 251,300 square miles; Mackenzie, 563,000 square miles; Ungava, 456,000 square miles; and Franklin, gross area unknown. The southern part of Athabasca has been formed into four districts, which contain areas as follows: Athabasca, 122,000 square miles; Assiniboia, 89,535 square miles; Alberta, 106,500 square miles, and Saskatchewan, 107,092 square miles. The great rush of gold-seekers to the Klondike region led to the establishment of the Yukon judicial district, and in 1898 the separate territory of Yukon, with an area of 198,300 square miles, was created, with its administrative center at Dawson. Mining is the chief industry in the Yukon territory. In the possession as a whole there are extensive mineral deposits, including gold, silver, copper, iron, salt, sulphur, and petroleum. Vast and valuable forests abound in many sections, particularly in the south and central parts, and there are lake fisheries and fur-bearing animals of great value.

The lake region extends in a northwesterly direction from Lake Superior to the Arctic circle, and includes Lakes Winnipeg, Athabasca, Wollaston, Great Slave, Caribou, Great Bear, and hundreds of others. These lakes are of value in navigation, and to them are added fully 10,000 miles of river navigation. The climate is cold. In the northern part the soil is frozen the entire year, but in the southern and western regions are tracts having a climate suitable for the production of cereals and stock. The southern part is traversed by the Canadian Pacific railway, and there are a number of additional lines and branches, the total being 2,425 miles. The government maintains an efficient postal system, encourages settlements under a liberal system of land laws, and gives support by taxation to public education. Its government is administered by a lieutenant-governor and a legislative branch, the former being appointive and the latter partly elective and partly appointive. Regina is the seat of government, and has a population of 2,500. Other towns are Prince Albert, Calgary, Edmonton, and Lethbridge. The total population of this vast region is only 158,940, of which 40,130 are Indians.

NORWALK (nôr'wąk), a city of Connecticut, in Fairfield county, on the Norwalk River and Long Island Sound, about forty miles from New York. It is conveniently connected by railroads and has a good harbor. There are numerous municipal facilities, including waterworks, pavements, and street railways. The manufactures embrace straw and felt hats, boots and shoes, cotton and woolen goods, machinery, musical instruments, flour, and paper boxes. It is the seat of a public library and several fine churches, and contains a number of daily and weekly periodicals. Population, 1900, 6,125.

NORWALK, county seat of Huron county, Ohio, situated sixteen miles southeast of Sandusky. The surrounding country is farming and dairying, and there are extensive manufactures of musical instruments, farming implements, flour, umbrellas, sewing machines, and machinery. It is supplied with modern facilities, including electric lights, pavements, good schools, waterworks, and a number of churches. It has a growing trade in merchandise. Population, 1900, 7,074.

NORWAY, a country of northwestern Europe, occupying the western portion of the Scandinavian peninsula. It is separated from Sweden by the Kiolen Mountains, which continue southward toward the Skager Rack in the form of a sloping tableland. The western boundary of Norway is formed largely by the Atlantic Ocean, its northern by the Arctic Ocean, eastern by Russian Lapland and Sweden, and southern by the North Sea and Skager Rack. It extends north and south for a distance of 1,075 miles, and has a width of from fifty to 275 miles. Norway has an area of 124,500 square miles. Its coast is indented by numerous bays that have rocky and precipitous shores, and there are hundreds of islands lying near the mainland. The natural phenomena include vast glaciers and snow-fields, the climate being particularly cold in the northern part, where the summers are short and warm, but the winters extremely cold and the winter nights long. There are a number of mountain peaks, the most important including Snehaetten, 7,570 feet; Glittertink, 8,380 feet, and Lodalskaupen, 6,785 feet. Most of the mountain region assumes the form of elevated tablelands, called fields, and in many places are extensive fiords. The former include the Dovre Field, Hardanger Field, and many others.

Norway has few large rivers, the most important flowing toward the south and including the Glommen, Lougen, and Topdals. The Tana River flows into the Arctic Ocean, and forms the boundary between Norway and Russia. It is beautified by

many waterfalls and lakes, the latter embracing Miosen, Kroderen, Fœmund, and numerous other lakes of smaller size. There are fine forests of pine and fir, and in some regions birch and other trees abound. The bear, lynx, wolf, reindeer, deer, birds of prey, and elk prevail in various parts, and excellent fisheries are abundant, including particularly those of the fin-whale, blue-whale, herring, seal, salmon, cod, mackerel, lobster, and shark. Norway has extensive deposits of minerals in different parts, embracing such valuable kinds as copper, iron, cobalt, silver, nickel, and sulphur.

Norway has extensive manufactures of silk, flax, textiles, cotton and woolen goods, flour, lumber products, tobacco and cigars, spirituous liquors, sugar, matches, machinery, and utensils. Its immense forests and fisheries yield a large revenue, and there is a growing import and export trade. The foreign trade is largely with Germany, Sweden, Britain, and Russia, the principal exports being fish, lumber products, skins, furs, matches, and seal oil; and the imports, sugar, tobacco, textiles, petroleum, and wool. Agriculture is carried on most extensively in the southern part, the cereal products embracing rye, wheat, oats, vegetables, and small fruits. There is also a considerable production of stock, particularly of beef cattle, milk cows, horses, sheep, goats, swine, and poultry.

Educationally Norway occupies a very prominent position, especially in elementary education, since its free school and compulsory attendance law have almost entirely eradicated illiteracy among all classes. There are elementary and high schools in all the settled portions of the country, and schools of industry, arts, philosophy, and sciences are maintained in the larger cities. The University of Christiania is the most important institution, having fine courses of study, sixty professors, and an attendance of 1,200 students. Efficient support is given by the government to internal improvements, such as canals, highways, harbors, telephone lines, and the construction of railroads. All faiths are tolerated, but Lutheran is the dominant church and includes in its membership a large majority of the people. The militia, or landvœrn, embraces the principal portion of the army, and the landstorm includes those liable to service in times of war, all of the members being liable to a brief service as a means to develop military efficiency. All men over twenty-two years of age are included in the compulsory military service in time of war. The standing army numbers about 30,000 men and 900 officers, and there is a navy of about forty vessels, including two ironclad monitors and five armored gun-vessels. Christiania is the capital. Other important cities include Bergen, Trondhjem, Stavanger, Drammen, and Frederikstad. The population of Norway is 2,395,500.

The history of Norway is closely associated with that of Sweden and Lapland. At the dawn of the historical period of western Europe the Norwegians were governed by various chiefs and kings, and many of the different classes were associated with the Northmen. They were noted particularly for great skill in maritime service, and acquired a reputation as piratical conquerors of the sea. In the latter part of the 9th century they were governed by Harold Fairhair, who was succeeded by his son, Eric, in 933, but the latter was deposed by his brother, Hako I., in 938. Hako I. became converted to Christianity, and was succeeded by other sovereigns who gave support to the spread of that faith, and in 1042 the ruling sovereign united Denmark to his domain. In 1066 many Norwegians took part with the Northmen of France in conquering England.

In 1319 Norway and Sweden became united under Magnus V., and in 1397 Eric of Pomerania was crowned king of Norway, Denmark, and Sweden. Subsequently many wars preyed upon its people and resources, and, after the defeat of Napoleon in 1814, Norway was united by the treaty of Vienna with Sweden. Some friction resulted in efforts to unify the governmental institutions of Norway and Sweden for the reason that the constitution of Norway is democratic in character, and in 1821 all titles of nobility were abolished. The king of Sweden is also king of Norway, but the legislative and judicial functions are vested in the people of Norway. Its legislative power rests in the storthing, in which the members hold position three years, and are elected by male citizens over twenty-five years of age possessing certain property qualifications. The king has a limited veto power, and practically all royal appointments are limited to Norwegians.

The language of Norway is more closely associated with that of Denmark and Iceland than that of Sweden, though it has a considerable similarity to the latter. Its literature is rich in history, poetry, astronomy, botany, geography, and religion, and is closely associated with that of the other Scandinavian countries. Many of the early writings are interwoven with the "Edda," two early productions containing legendary verses of heroes and gods. There are also the "Sagas," in which are included accounts of the conversion of Scandinavian peoples to Christianity. "The Chronicle of Norwegian Kings" is one of the numerous early literary productions, but during the middle period much inspiration was drawn from the literature and language of the Danes. The Norwegian writers of ability belong distinctly to later times and include Wergeland, Monsen, Welhaven, Garborg, Bjornson, Absjorsen, Ibsen, and others. See Sweden.

NORWICH (nŏr'wĭch), a city of Con-

necticut, in New London county, on the Thames River, ninety-five miles southwest of Boston. It occupies a fine site, has good railroad and steamboat connections, and is the seat of a large trade in coal and merchandise. There are manufactures of cotton and woolen goods, flour, paper, leather, cutlery, bicycles, hardware, type, cordage, machinery, and furniture. It has a fine courthouse and county buildings, several excellent schools, a number of churches, and good municipal improvements. The site was purchased from a Mohican Indian chief in 1656, and the town was founded in 1659. Population, 1900, 17,251.

NORWICH, county seat of Chenango county, New York, on several railroads and the Chenango River and Canal. It is surrounded by a productive farming and dairying country, and has many excellent municipal facilities. Among the manufactures are textiles, lumber products, furniture, machinery, carriages, and leather goods. Population, 1900, 5,676.

NORWICH, an important city of England, capital of Norfolk county, ninety-eight miles northeast of London. It is surrounded by a fertile agricultural and dairying country, has several important railway lines, and engages extensively in the manufacture of mustard, starch, boots and shoes, clothing, vinegar, machinery, ironware, and farming machinery. It is the seat of a number of fine schools, many churches, and a cathedral of the Norman style founded in 1095, which has a spire 315 feet high. The city was founded about 446, was several times occupied by the Danes, and by the 11th century attained to commercial importance. It has sent representatives to parliament since 1296, and was the seat of sixty-six bishops. There are public libraries containing upward of 50,000 volumes. The city has been materially improved within recent years, and has a large trade. Population, 110,340.

NOSE, that part of the face of man and of the higher animals containing the nostrils and the organ of smell. In man the nose projects as a triangular pyramid from the center of the face, above the upper lip. It consists of the external and internal parts, the latter being formed of the nostrils, two cavities divided by an upright wall or septum. The nose is composed of cartilage covered with muscle and skin, and is joined to the skull by small bones. The nostrils are lined by a continuation of the mucous membrane of the throat, and open at the back into the pharynx. At the roof of the nose is a long, sieve-like plate, through which the olfactory nerves enter, and these, ascending to the brain, give rise to the sensation of smell. Odorous particles need not enter the nose to produce smell-impulses, but must be conveyed to the membrane by the air or by some other gaseous medium. The smell-impulses are more intense when the odorous air is drawn up higher into the nasal passages, for the reason that they then affect a greater surface. The nasal passages are concerned in the production of

NOSE.

A, b, c, d, interior of the nose, which is lined by a mucous membrane; *n,* the nose; *e,* the wing of the nose; *q,* the nose bones; *o,* the upper lip; *g,* section of the upper jaw-bone; *h,* the upper part of the mouth, or hard palate; *m,* frontal bone of the skull; *k,* the ganglion or bulb of the olfactory nerve in the skull, from which are seen the branches of the nerve passing in all directions.

voice, and serve in the function of breathing. Small hairs are usually abundant in the nostrils. They serve to prevent dust particles entering in breathing.

NOTATION AND NUMERATION, two common terms employed in arithmetic. The former designates a system of figures or characters used to represent numbers, and the act of recording them; while the latter is employed to express the art of reading numbers when expressed by numerals. The numerical symbols used in notation are known as the Arabic and the Roman. The principal characters up to one million are relatively as follows: Arabic 1, Roman I; 2, II; 3, III; 4, IV; 5, V; 6, VI; 7, VII; 8, VIII; 9, IX; 10, X; 11, XI; 12, XII; 13, XIII; 14, XIV; 15, XV; 16, XVI; 17, XVII; 18, XVIII; 19, XIX; 20, XX; 30, XXX; 40, XL; 50, L; 60, LX; 70, LXX; 80, LXXX; 90, XC; 100, C; 500, D; 1,000, M; 1,000,000, M. The names applied to the different denominations include the following: unit, ten, hundred, thousand, million, billion, trillion, quadrillion, quintillion, sextillion, septillion, octillion, nonillion, decillion, etc.

NOTTINGHAM (nŏt'ĭng-ăm), a city of England, capital of Nottingham county, on the Trent River, 118 miles northwest of London. It occupies a fine site in a fertile region, has extensive railroad facilities, and enjoys a large commercial and manufactur-

ing trade. The older streets are narrow and irregular, but the newer part of the city is spacious, and contains many excellent business blocks and residences. There are extensive manufactures of cotton and woolen textiles, lace, needles, hosiery, tobacco products, machinery, furniture, chemicals, and hardware. The city has a number of fine educational institutions, among them the Mechanics' Institute, University College, Congregational Institute, several high schools, and the Nottingham School of Art, a fine structure in the Italian style erected in 1865. It is the seat of several benevolent institutions, many fine churches, and the Roman Catholic Cathedral of St. Barnabas. It has a free museum of natural history, several excellent libraries, and a free public library of 50,000 volumes. The city is supplied with electric and gas lighting, street railways, pavements, public parks, waterworks, and several fine statues and monuments. It was founded in the early Anglo-Saxon occupation of England, and was held by the Danes until 868. In 1643 it was taken from Charles I. by the parliamentarians. Population, 239,780.

NOVA SCOTIA (nō'va skō'shĭ-a), a province of the Dominion of Canada, consisting of Cape Breton Island and the peninsula lying east of New Brunswick. The two are separated by the Gut of Canso, and there are a number of extensive coast indentations and several small islands. The total area is 20,600 square miles. A large part of the coast region contains land of great fertility. There are also fertile valleys and districts in the interior, about one-half of the entire surface being susceptible to cultivation. Ranges of hills are abundant in the northeastern part, though there are no mountains of large extent, and in the interior are several fine lakes. Extensive and valuable forests abound. The province has productive deposits of coal, iron, copper, silver, gold, lead, gypsum, tin, and petroleum. Its fisheries are of immense value, the principal products including cod, herring, haddock, mackerel, and lobster. Wild fowl are abundant, and there is also such game as the caribou, fox, mink, bear, otter, and other fur-bearing animals. The cereal crops embrace wheat, oats, barley, maize, potatoes, a number of varieties of small fruits, rye, and vegetables. Milk cows, beef cattle, sheep, horses, swine, and poultry are produced in abundance. The government supports an efficient postal system, public schools, and several institutions of higher learning. At present the railroad lines include 1,200 miles. Navigation is secured against dangers by a large number of lighthouses and fog-alarms, these being necessary on account of dense fogs that prevail at different seasons of the year. The climate is less subject to changes than other parts of British North America, and there is an abundance of rainfall. The winters are cold and long, but the summers warm, and all seasons of the year are healthful.

The first European to visit Nova Scotia was Cabot, who cruised upon its coast in 1497. In 1604 the first settlements were established at St. Croix and Port Royal by the French, who named the region Acadia. The English claimed the region by right of discovery, and made a number of attempts to dispossess the French and form colonies. Cromwell took possession of it for the English in 1654, but it was ceded to France in 1667, and by the treaty of Utrecht it came permanently into English possession in 1713. An oppressive policy led to local differences in 1755, and fully 215,000 Acadians were banished in that year and their property confiscated. Cape Breton Island was annexed to Nova Scotia in 1763, and New Brunswick was separated from it in 1784. The province came under the jurisdiction of the Dominion of Canada in 1876. It is at present divided into eighteen counties. The government is administered by a lieutenant-governor, who is assisted by a ministry. Its legislative council consists of twenty-one members, and its legislative assembly of thirty-eight members. It is represented by twelve members in the senate of the federal parliament and twenty-one members in the house of commons. Halifax is the capital. Other cities of importance include Amherst, Truro, Spring Hill, Pictou, Lunenburg, North Sydney, and Stellarton. Population, 1901, 459,574, of which about 2,125 are Indians.

NOVA ZEMBLA (nō'va zĕm'bla), an island belonging to the Russian Empire, situated between the Arctic Ocean and Kara Sea. It is separated from Waaigat Island by Kara Strait, and divided into two parts by Matotchik Strait. Its length is 625 miles; breadth seventy-five miles, and estimated area 40,500 square miles. Nova Zembla was known to the hunters of Novgorod in the 11th century, but extensive knowledge was not accumulated until in the last century, when surveys were made and published. Its climate is colder than that of Spitzbergen, for the reason that the latter is affected by oceanic currents to a much greater extent, and the vegetation consists largely of stunted shrubs, lichens, and various short grasses. Vast flocks of wild fowl frequent the shores in summer and autumn, and there are abundant whale, seal, and dolphin fisheries. It is frequented by the bear, ice-fox, lemming, and reindeer, but insect life is very limited. There are a few scattered settlers in the southern part, and during the milder season of the year large numbers of Russian hunters and fishers frequent the different islands and the shores.

NOVELLO (no-vĕl'o), **Joseph Alfred,** organist and composer, born in London, England, in 1810; died in Genoa, Italy, July 17, 1896. He was the son of Vincent Novello, a German musician born in 1781. The son

became a musical publisher at the age of nineteen years, and formed the friendship of Felix Mendelssohn. Later he aided Bessemer in producing Bessemer steel, and in 1856 retired from business and settled in Italy. His publishing house issued many standard compositions, among them "Creation" and "Messiah." He also wrote "Epistle on Naval Architecture," a publication devoted to the construction of ships.

NOVELS, the name applied to fictitious tales, usually written in prose, and based on a plot of greater or less intricacy. They portray representations from real life, especially emotional periods in the lives of the persons depicted. A novel differs from an epic in that the latter deals with ordinary characters and actions, and from romance in that it professes to represent things from real life, while romance appeals to the mysterious, supernatural, and heroic. Novels were written for entertainment in an early period. The first known are the "Milesian Tales," none of which are now extant. These writings are attributed to Aristides, a member of an Ionic Grecian colony in Asia Minor, known as Milesia, which was conquered by the Persians in 494 B. C. Later both novels and romances became popular among the Greeks and Romans. Modern novel writing dates from the early part of the 14th century, the first being in the stories of Giovanni Boccaccio, who published the finest in point of style and sentiment in his "Decameron" in 1358. Later appeared many novels. They were inspired largely by this work and partly by "Il Novelino," one of the celebrated productions of Italian masters that appeared rather as a compilation than an original work near the close of the 13th century.

Excellent novels soon after developed in the literature of all leading countries, and by the early part of the 17th century each of the principal languages of Europe had incorporated prose fiction as a representative type in the recognized literature. Writers multiplied in the 18th and 19th centuries. Each of the different nations having a literature at all include among its writers a number of celebrated novelists. The leading American novelists include Washington Irving, J. Fenimore Cooper, Oliver Wendell Holmes, Nathaniel Hawthorne, Edgar A. Poe, Harriet Beecher Stowe, Brockden Brown, W. D. Howells, Bret Harte, W. G. Simms, and Henry James. Among the English writers of novels may be mentioned Sir Walter Scott, Bulwer-Lytton, George Eliot, Walter Besant, Charles Dickens, Rider Haggard, Wm. M. Thackeray, and Thomas Hughes; among the German, Wilibald Alexis, Gustaf Freytag, Georg Ebers, Gottfried and Johanna Kinkel, and G. zu Putlitz; among the French, Victor Hugo, George Sand, Alphonse Karr, Prosper Merimee, Daudet, and Zola.

NOVEMBER. See **Months**.

NOVGOROD (nŏv'gō-rŏd), a city of Russia, capital of a government of the same name, located on the Volkhof River, 115 miles south of St. Petersburg. It is conveniently connected by railways, but is of interest mainly because of its importance as a seat of Russian influence in the early history of Europe. Novgorod was the most important city of northern Europe in the 12th century, when it had a population of 400,000 and maintained a form of government largely republican in character. It may be considered the nucleus around which grew Russian influence, since the history of that country commenced when the Norman prince, Rurik, began his reign, in 862, over the tribes resident in and around Novgorod. In 1862 a great monument was erected there by the Russian government to commemorate the thousandth anniversary of that event. Its decline began in 1471, when Ivan III. destroyed a part of the city, and it was further injured by the opening of the port at Archangel and the founding of St. Petersburg. The Church of St. Sofia, founded in the 11th century, is its most noteworthy building, but it also has several other fine churches, a number of schools, and manufactures of clothing, machinery, spirituous liquors, and utensils. Waterworks, pavements, and street railways are among the improvements. There is a considerable trade in hemp, flax, and cereals. Population, 18,290.

NUBAR PASHA (noo'bar pä-shä'), Egyptian statesman, born in Smyrna in 1825; died in Paris, France, Jan. 14, 1899. He was of Armenian descent, studied in Switzerland and France, and in 1842 became secretary to the minister of foreign affairs in Egypt. Later he served as secretary to Mehemet Ali and Ibrahim Pasha, and in 1866 became minister of foreign affairs, which position he held till 1876. While serving in that capacity the sultan of Turkey gave him the title of khedive. His most important acts included reform measures to introduce European customs into Egyptian affairs. He was president of the Egyptian cabinet in 1878-79, in 1884-88, and in 1894-95. At the close of the year 1895 he resigned on account of failing health.

NUBIA (nū'bĭ-ą), a region of Africa situated south of Egypt, west of the Red Sea, and north of Abyssinia. It extends west into the Sahara Desert and the Soudan. The surface consists largely of desert regions, but there are fertile districts along the Nile and Mareb rivers, and some of the valleys extending inland from the Red Sea. Nubia was known as a part of Ethiopia by the ancients. It formed a part of the possession of the Pharaohs, but later was organized by native rulers, who adopted a form of Christianity and a civilization patterned after the Egyptian. Within the last century it has had a varied existence, being governed in the early part of that period by native chiefs of

the Moslem faith, but in 1820 it was conquered for Egypt by Ismail Pasha. It is at present connected in part with the government of upper Egypt and in part with the Egyptian Soudan. The area usually included in the region is estimated roughly at 445,000 square miles, in which about 1,500,000 people are resident. The population consists largely of Numidians of the Ethicpian and Arabian races, who have a dark-brown complexion, medium stature, and engage principally in the culture of cereals and in pastoral pursuits. Among the principal exports from the region are timber, ivory, ostrich feathers, honey, musk, and small grain. There are rude manufactures of pottery, coarse cotton and woolen goods, and household utensils. Slavery existed until within comparatively recent times, and polygamy is still practiced. Mohammedanism is the recognized form of religion.

NULLIFICATION (nŭl-lĭ-fĭ-kā'shŭn), in government, an act whereby the law is rendered null and void and inoperative. It was first applied in the United States by advocates of state sovereignty, in 1799, when adherents of that political belief urged the passage of resolutions in the Kentucky legislature for the purpose of rendering illegal certain acts of the federal congress. The theory was exemplified in Pennsylvania by the Olmstead Case in 1809, and in Georgia in the matter of the Cherokees in 1825–30, but it was urged particularly in 1830 by John C. Calhoun, who claimed that a state legislature could declare unconstitutional any federal law objectionable to that state, and could withdraw from the Union in case such a law was enforced. The legislature of South Carolina passed a law in 1832 to nullify a tariff enactment passed in that year, but President Jackson issued a proclamation declaring nullification incompatible with the existence of the Union and contrary to the constitution. South Carolina repealed the nullification ordinance after a compromise tariff bill introduced by Henry Clay was enacted. The theory of nullification was entirely suppressed by the defeat of the Confederacy in the Civil War.

NUMA POMPILIUS, the second king of Rome, successor of Romulus, who is made by tradition the ruler from 716 to 672 B. C. He is reputed of Sabine origin, a native of Cures, and son of Pompo. His natural ability and philosophical training led to his becoming popular as a legislator, and, when the people chose a ruler, it was natural that he should receive their support and later the approval of the senate. Numa is known more particularly by tradition than by history, and he is regarded the founder of Roman religious institutions and ceremonials, and as one of the ablest of early expounders of the principles of justice, law, and morality. He left a number of writings, but they were burned about 400 years after his death.

NUMBER, in grammar, that form of a word from which it may be determined whether the speaker or writer refers to one or several individuals. There are two numbers—the singular and plural. The singular number denotes but one, and the plural number denotes more than one. In arithmetic, number is the measure by which quantities are classified. A number divisible by two is called an even number; when not so divisible it is odd, and when it cannot be divided by any other number except itself and unity, it is said to be prime. An abstract number is one written by itself, as 8; and a concrete number is one denoting a certain denomination; as 8 children. Ordinal numbers designate the position, as first, second, third, fourth, etc.; while cardinal numbers answer the question, How many? as 1, 2, 3, 4, etc.

NUMIDIA (nū-mĭd'ę-ą), the name applied by the Romans to a large region in northern Africa, which nearly corresponds to the region occupied at present by Algeria. The territory varied somewhat according to the fortunes of war, being at one time restricted to the present territory of Tunis, but it was enlarged by the successes of Roman military leaders. The inhabitants at the time of Roman occupation are the progenitors of the modern Berbers, and are noted for their excellent horsemanship, skill in warfare, and their unscrupulousness in practicing savagery. They were governed by tribal chiefs, but subsequent to the Second Punic War they became united under the king of the eastern Numidians, Massinissa, and soon became allies of the Romans and aided in the contest against Hannibal. Subsequently this king effected a still greater union of the different tribes, and the united nation developed marked power under Jugurtha and Juba. Cæsar attained a victory over Juba I. and made Numidia a Roman province in 46 B. C., but a large region in the western part was given by Augustus to Juba II. Cirta was the capital of Numidia under the Romans, and subsequently it became known as Constantina, a name it still retains. Other towns of importance were Hippo Regius, Theveste, Lambæsa, and Zama.

NUN, a member of a religious order of women, who has devoted herself to a religious life, and lives in a convent under a perpetual vow of poverty, celibacy, and obedience. The origin of the word is not clearly known, but it is thought to be from a Coptic or Egyptian root, which means virgin. Nuns are governed quite largely in convents by rules similar to those governing masculine orders, and the superiors are known as abbesses or prioresses, and generally are called mother superior. Their occupations vary according to fitness and the conditions prevailing in the country where the convent is maintained. The most common employment includes the work of education, care of

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Almond
Chestnut.
Brazil nut.

Life-size.

Filbert
Peanut.

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Pecan.
Hickory nut.
English W[illegible]

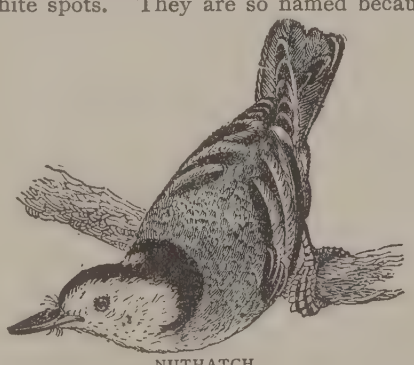
the sick or poor, and various employments in household or productive arts. It is said that St. Anthony in 250 A. D. aided his sister in founding the first nunnery, and he was the first to make authentic note of nuns. At present there are more nuns in the Roman Catholic Church than monks, and in some countries they have a large share in the development of education and educational arts.

NUR-ED-DIN MAHMUD (mä-mo͞od′) emir and sultan of Syria, born in Damascus, Turkey, in 1116; died there in May, 1173. He is celebrated as a patron of learning and art, established mosques and hospitals, founded cities, and gave encouragement to industrial arts, but he became equally celebrated as an avowed opponent to the spread of Christianity. His father was poisoned by eunuchs in 1145, when he succeeded to sovereignty, and defeated the first and second Crusades of Christians to the Holy Land. Later he made a successful campaign in Tripolis, obtained possession of Damascus, and in 1168 assumed the title of sultan of Syria and Egypt. He ranks as one of the most successful military defenders of the Moslem faith. Writers give him credit for prudence in war. He is said to have been the first to employ carrier-pigeons to convey messages in time of war.

NUREMBERG (nū′rĕm-bĕrg), an important city of Germany, in Bavaria, on the Pegnitz River, ninety-four miles northwest of Munich. It is nicely located on a well cultivated plain, has important railroad connections, and is the center of a large trade. Among the manufactures are chemicals, railroad cars, metal products, spirituous liquors, musical instruments, clocks, machinery, cigars, lead pencils, toys, and hardware. Nuremberg is one of the largest hop markets in Europe and is noted for its extensive printing and book-binding industry. The city has a fine system of public schools, and is the seat of the Germanic National Museum and the Bavarian Industrial Museum. It contains the interesting churches of St. Lawrence, Old Lady, and St. Sebald, three Gothic structures built between the 13th and 15th centuries. Besides the libraries in its museums, there is a public library of 60,000 volumes. It has a number of noted educational institutions, several fine parks, electric lighting, street railways, and a number of historic statues and monuments. Its castle was founded by Conrad II., in 1024. It was improved by Frederick Barbarossa in 1158, and was a favorite residence of German emperors from 1424 to 1806. The palace contains excellent carvings, frescoes, and many treasures of art. Nuremberg entered enthusiastically into the spirit of the Reformation, and Gustavus Adolphus was besieged there in 1632 by Wallenstein. The discovery of the sea passage to India caused it to lose a portion of its prosperity, and the Thirty Years' War cost 10,000 of its inhabitants their lives. It became a part of the Rhenish Confederation in 1803, was annexed to Bavaria in 1806, and since the extensive building of railroads in Germany it has again entered upon a period of enlarged prosperity. Population, 263,260.

NUT, the name used in botany to designate a fruit consisting of a seed, or kernel, enclosed in a hard leathery or woody shell that does not open when ripe. The term is restricted usually to a one-seeded pericarp resulting from a compound ovary, but it is sometimes applied to certain tubers, as those of the sedge, known as nut-grass. The most valuable and best known nuts include the walnut, hickorynut, hazelnut, Brazilnut, butternut, cocoanut, chestnut, and pecan. Nuts form an important article of commerce, many of them being edible, while others furnish important medical or chemical properties. Those named above are all edible, while the gallnuts, valonia nuts, and myrobalan nuts serve in dyeing and tanning. Vegetable ivory, secured from the nut of the Peruvian palm, and cóquilla nuts serve in the manufacture of ornaments. Betelnuts are used in manufacturing tooth powder and paste. Many of the oil nuts of commercial importance are not edible, though most of the edible nuts are rich in oil, while they also contain sugar, starch, and nitrogenous constituents.

NUTCRACKER (nŭt′krăk-ĕr), a genus of birds found widely distributed in Eurasia, which somewhat resemble the starlings and woodpeckers. They have a cone-shaped bill and square-cut tail, and the plumage is of different shades of brown, studded with long white spots. They are so named because



NUTHATCH.

they feed with delight on nuts, which they carry to some convenient crevice in a tree and hammer with the beak till the kernel is exposed. However, they also feed on insects and beetles. Their eggs are a pale bluish-green and marked by pale olive or ash-colored freckles. An allied species of birds found in America frequents the shores of streams and seas, and is noted for its plumage of diversified hues. It is about thirteen inches long, and its bill is about two inches.

NUTHATCH (nŭt'hăch), a genus of birds native to North America, Eurasia, and other regions. It is distinguished for its short legs, sharp straight bill, hooked claws, and solitary and shy habits. The genus includes many species, most of which are about six inches long. They build their nests in hollow trees, where they carry leaves and sticks, and, like the nutcracker, are fond of nuts. However, they also cut into the stems of trees for insects much like the woodpeckers, and are noted for being extremely shy. The color is bluish-gray on the upper parts; the under parts are reddish-brown, and the flanks are a rich chestnut color. The bill is wedge-shaped, and they are often seen descending the trunk of a tree head downward.

NUTMEG (nŭt'mĕg), the kernel of the fruit of various trees, especially that of the nutmeg tree. The fruit is an edible drupe

NUTMEG.

of a yellowish color, about two inches in diameter, and when mature it splits into halves, exposing a single seed. The seed has a thin hard shell surrounded by a fibrous substance of crimson color, which, when dried, becomes the mace of commerce. When the kernel is dried and shelled it becomes the nutmeg, which is valued highly in cooking for its aromatic odor and flavor. The kernel also yields the oil of mace, or nutmeg butter, which is obtained from it by compression. Nutmegs are produced extensively in the East Indies, but the cultivation of the nutmeg tree is now carried on in the West Indies, portions of Central America, Brazil, and Sumatra, where it has been naturalized. It attains a height of from fifteen to thirty feet, has a reddish-brown bark, and branches considerably.

NUTRITION (nu-trĭsh'ŭn), the process by which growth is promoted and waste repaired in any living organism, and which applies both to animal and vegetable life. Animal nutrition embraces the process or change which the food-elements in the blood currents undergo for the production of energy or heat, and for the purpose of conveying certain waste matter from the system. Healthful nutrition is stimulated by a wise selection of the food with the view of providing the necessary support to the body. Food is masticated in the mouth and mixed with saliva, then swallowed, acted upon in the stomach by the gastric juice, passed into the intestines and dissolved by the bile, pancreatic juice, and other liquids, and in the processes it undergoes in the stomach and intestines the nourishing parts are absorbed and thrown into the blood-vessels. All the tissues derive their nutrition from the blood in the capillaries. The material for it is prepared in the blood, and each individual part by a process of cell-growth carries on the work by which the various portions of the body are enlarged or by which the waste is overcome. Vegetable nutrition consists of the seven processes known as absorption, circulation, respiration, transpiration, excretion, assimilation, and growth. The root, stem, and leaf are the organs of nutrition.

The varieties of human food differ in the per cent. of nutritious substances, as is shown by the following list of common foods:

Raw oils	94	Roast pork	24
Boiled beans	93	Fried veal	24
Butter	93	Potatoes	22½
Boiled barley	92	Broiled venison	22
Baked cornbread	91	Boiled codfish	21
Wheat bread	90	Peaches	20
Barley bread	88	Apples	16
Boiled rice	88	Beets	14
Broiled beans	87	Whipped eggs	13
Rye bread	79	Currants	10
Oatmeal porridge	75	Cabbage	7½
Broiled mutton	30	Milk	7
Raw plums	29	Boiled turnips	4½
Raw grapes	27	Raw melons	3
Raw beef	26	Raw cucumbers	2
Roast poultry	26		

NYASSA (nē-äs'sä), a lake of Africa, situated on the southwestern boundary of German East Africa. It is 300 miles long, from twenty to sixty miles wide, and its surface is 1,525 feet above sea-level. It receives the water from several rivers and has a great depth. The Shire, a tributary of the Zambezi, is its outlet. The Portuguese first discovered the lake in the 17th century and named it Maravi, but definite knowledge of it dates from its discovery by Livingstone, in 1859. It has fresh water and abounds in fish.

NYASSALAND, a region of Africa, situated west of Lake Nyassa, and populated by native tribes. The region has extensive forests, is alternated more or less with undulating plains and hills, and much of the soil is highly fertile. The natives cultivate tobacco, maize, cassava, peas, and fruits, and engage in trade. Formerly an extensive slave trade was carried on in the region by Arabs, but this has been suppressed recently, and a number of missionaries are operating successfully. The principal missionary and trade stations are at Port Johnston, Livingstonia, Marengas, and Blantyre.

NYE, Edgar Wilson, humorist and

author, born in Shirley, Maine, Aug. 25, 1850; died in Asheville, North Carolina, Feb. 22, 1896. His parents settled in Wisconsin in 1852, and he was educated at River Falls in that state. In 1875 he settled in Wyoming, where he was admitted to the bar the following year, and in 1881 began the publication of the "Laramie Boomerang." It was his practice to write in a humorous vein, giving to small things great proportions, and, on the other hand, minimizing the more important, and by his characteristic style and energy succeeded in calling wide attention to his town. Articles from the pen of "Bill Nye," as he was generally called, were read with interest in all parts of the United States. While publishing his paper, he held the positions of justice of the peace, school superintendent, postmaster, and United States commissioner, and afterward became a member of the legislature. Later he suspended publication of his newspaper and settled in Hudson, Wisconsin, as a lecturer and a contributor to periodicals, but after two years was engaged as a writer in New York. His contributions to the press were controlled by a syndicate and appeared in nearly all of the different dailies and weeklies of the United States, much of the matter being stereotyped for that purpose. He published his first book in 1881 with the title of "Bill Nye and the Boomerang." Other writings that had a wide reading include "Stag Party;" "Bill Nye's Blossom Rock;" "Bill Nye Thinks;" "Baled Hay;" "Forty Liars and Other Lies;" "Remarks by Bill Nye;" "Bill Nye's History of the United States," and "Bill Nye's History of England."

NYMPHS (nĭmfs), the graceful beings mentioned in Greek mythology as the presiding deities of the woods, streams, meadows, grottoes, hills, and the sea. These divinities were supposed to be beautiful maidens of fairy-like form, though not immortal, and were robed in more or less shadowy garments. They were considered minor beings and no temples were dedicated to them, but they were held in the greatest veneration and were worshiped in grottoes or caves. There were different classes of nymphs, among them the Nereids, who presided over the sea; Dryads, those over the trees and forests; Naiads, those over wells, fountains, and lakes; and Oreads, those over mountains. Much beautiful statuary was dedicated to the nymphs, of which fine specimens are still extant.

THE CHARTER OAK, HARTFORD, CONNECTICUT.

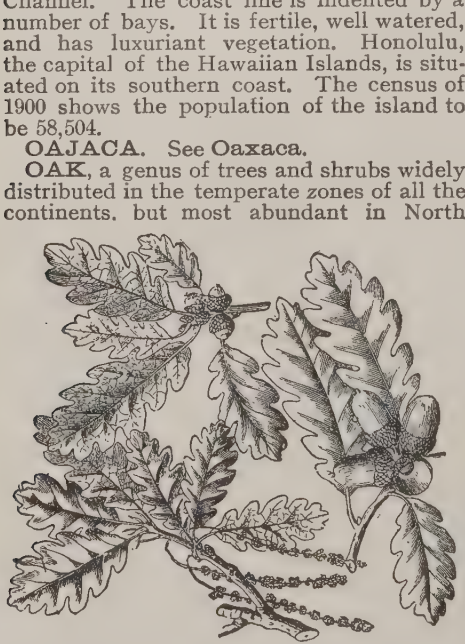
O

O, the fourth vowel and fifteenth letter of the English alphabet. It is uttered with the lips rounded and the back part of the tongue raised. In the English, o has six sounds or shades of sounds, as o in not, thought, go, move, woman, and come. It also combines with other letters to form digraphs, as oa, oo, and ou. In arithmetic it serves as a cipher; in grammar, as an interjection; and in chemistry, to denote the element oxygen.

OAHU (ō-ä′hōō), one of the principal islands of the Hawaiian group, the fourth of the group in size. It is situated between the islands of Molokai and Kauai, being separated from the former by Kaiwi Channel and from the latter by Kaieie Waho Channel. The coast line is indented by a number of bays. It is fertile, well watered, and has luxuriant vegetation. Honolulu, the capital of the Hawaiian Islands, is situated on its southern coast. The census of 1900 shows the population of the island to be 58,504.

OAJACA. See **Oaxaca.**

OAK, a genus of trees and shrubs widely distributed in the temperate zones of all the continents, but most abundant in North



OAK LEAVES AND ACORNS.

America. They are not common to the tropical regions of South America, Africa, or Australia. Fully 300 species are included, some of which are evergreen; among the latter are the evergreen oak of California and the live oak native to the southern states. The oak tree is noted from remote antiquity on account of its hardy wood and long endurance, from which it has been called "monarch of the woods" in poetry and oratory. It is of slow growth, attains a height of from forty to 150 feet, has long and spreading branches, and all species bear a fruit known as the acorn, which is a nut set in a cup. The leaves are variously formed, though they are mostly sinuate-lobed. The flowers are male or female, the male flowers being in scaly spikes and the female bud-shaped. Among the principal species are the white oak, burr oak, red oak, live oak, black oak, willow oak, scarlet oak, cork oak, Turkey oak, valonia oak, Barbary oak, evergreen oak, manna oak, and gall oak.

The oak tree is one of the noblest appearing forest trees. It reaches maturity in from 125 to 400 years, and endures to the age of from 600 to 1,000 years. In some of the European countries are oak trees that have existed for eight centuries in good condition, and with them many interesting historical incidents are associated, particularly the so-called King Oak of Windsor Forest, which is associated with the historical times of William the Conqueror. The wood of the oak tree is of much value in the industries, owing to its strength and endurance. It serves in the manufacture of furniture, for shipbuilding, in the construction of vehicles and mechanical appliances, and all classes of construction work where a durable and hardy wood is desired. Oak bark is used in the medical practice and for tanning, and oak galls, morbid growths resulting from insects, also are employed for the latter purpose. Cork oak is grown extensively in the countries adjacent to the Mediterranean, and supplies the cork of commerce. Acorns serve in many countries as valuable food for swine and other domestic animals. The acorns of the Turkey oak and several other varieties are sweet and edible, and are used to some extent in making sweetmeats. Oak sawdust and bark serve in dyeing, yielding drab and brown colors, and a fustian cloth is made of the inner bark. The oak tree thrives best in loamy soils, but does not grow in stagnant water, and its roots penetrate deeply into the ground.

OAK GALLS, or **Oak Apples**, the growths caused upon different kinds of oak trees by the punctures of various insects. These insects pierce the stems of oak trees and deposit there a quantity of poisonous fluid and their eggs. An oak gall begins to form rapidly shortly after the puncture has been made, and before the eggs are hatched they are fully enclosed by it. The young insect develops into a gall fly while in the gall nut, but soon becomes liberated by eating its way out. Oak galls are of value in tanning and for the manufacture of ink.

OAKLAND, a city of California, in Alameda county, about six miles east of San Francisco. It is conveniently con-

nected with San Francisco and other cities by a number of railroads and ferry-boats, has a fine street railway system, electric lights, pavements, waterworks, and several extensive libraries. Among its manufactures are cotton and woolen goods, flour, leather, lumber products, machinery, jute, boots and shoes, and earthenware. The city has a fine system of public schools and is the seat of several colleges, a private normal school, and the Pacific Theological Seminary. Many business men of San Francisco have their residence in Oakland. It was so named from a natural grove of oaks, and was incorporated as a city in 1854. Population, 1900, 66,960.

OASIS (ō'ā-sĭs), a name now generally applied to any fertile tract of land in a desert region, but it was originally the name of several cultivated spots in the Libyan Desert, which were rendered productive by a number of springs issuing from the ground. The oases of the Libyan Desert are situated about 200 miles west of the Nile, and were known to the ancients by the names of Ammon and the Greater and Lesser Oases. Other oases are common to various parts of the Sahara Desert, the Desert of Gobi in Central Asia, the deserts of Persia and Arabia, and the Kalahari Desert of South Africa. Several oases of the Libyan Desert were mentioned by Herodotus, and were visited by Alexander the Great after the conquest of Egypt. This military hero visited Ammon to witness the celebrated temple of Jupiter Ammon. It is still cultivated, but is now generally called Siwah. Most of the oases occurring in nature are caused by underground rivers that form lakes by appearing on the surface, or whose waters come in close contact with the surface. Artificial oases have been formed in many parts of the Sahara by sinking wells, from which the water flows by pressure or is pumped by means of windmills.

OATES (ōts), **William C.**, statesman, born in Pike county, Alabama, Nov. 30, 1835. He attended the common schools, took a law course, and in 1858 was admitted to the bar. In 1861 he entered the Confederate service as a captain, commanded in a number of important battles, and in 1864 lost his right arm in the engagement at Richmond. Soon after the war he served as a member of the legislature of Alabama, took part in the constitutional convention of 1875, and in 1881 was elected to congress as a democrat. His efficient service caused him to be reëlected a number of times. Oates possessed efficiency as a speaker, and was influential as a public man.

OATS, a genus of grasses including about sixty species, valuable alike for the production of hay and for their straw and seed. They are cultivated extensively in all temperate climates, and form valuable food for horses and cattle, but are also used for human food. Oats are thought to be native to Asia, where they were cultivated from an early date. The greatest yield per acre is in the region extending somewhat south of the center between the tropic of cancer and the polar circle. The annual production of the United States aggregates fully 812,500,000 bushels, which represents a value of about $210,000,000. Among the leading oat-producing states are Iowa, Illinois, Wisconsin, New York, Minnesota, Pennsylvania, Nebraska, Ohio, Kansas, Missouri, and Michigan. The best known varieties of oats are the common white oats, Hungarian oats, bristle-pointed oats, Chinese oats, naked oats, Siberian oats, short oats, and peeled corn oats. The seed is sown in the spring, usually in April, and the crop is harvested in July or August. Oats yield from twenty to eighty bushels per acre, this depending upon the soil and climate, and weigh from twenty-eight to forty-five pounds per bushel. They are fed to stock, but principally to horses, after being threshed. Oats are prepared for table use by the kernel being separated from the outer shell, when they become a very nutritious food, and are eaten largely as a porridge and in cakes. In many cities of the United States are oat-meal mills, one of the largest in the world being at Cedar Rapids, Iowa.

HEAD OF OATS.

OAXACA (wä-hä'kä), or **Oajaca**, a city of Mexico, capital of a state of the same name, and connected with other Mexican cities by railways. It is situated about 210 miles southeast of the city of Mexico, and is surrounded by a fertile agricultural and fruit-growing country. In its vicinity are many excellent gardens and cochineal plantations. Among the manufactures are sugar, clothing, cotton and woolen goods, chocolate, machinery, and utensils. The city has a number of fine schools, a cathedral, and a public library. It is the seat of a bishopric and a theological institution. Population, 30,220.

OBADIAH (ō-ba-dī'ah), the fourth of the minor prophets, whose book contains only one chapter of twenty-one verses. His prophecies consist of denunciations against the Edomites for helping to plunder Jerusalem when that city was captured by a heathen foe, and toward the latter part are predictions of the future glory in store for the Jews. It is thought that the book was written between 588 and 583 B. C.

OBELISK (ŏb'ĕ-lĭsk), a square monument with a pyramidal top, and generally diminishing in size toward the upper end. Ancient Egypt contained many obelisks, which were erected as symbols to the supreme god. It is thought that the first obelisk was erected in the time of the Trojan War by Rameses, king of Egypt, who employed 20,000 men in

building a monument forty cubits high. The majority of Egyptian obelisks have a uniform thickness in proportion to their height, being from one-ninth to one-tenth as thick as they are high, though in height they vary from a

OBELISK, CENTRAL PARK, NEW YORK.

few inches to 180 feet. Many of the Egyptian monuments of this character were removed to Rome by the Roman emperors. In 1833 a beautiful specimen from Luxor was erected in Paris. Two taken from Heliopolis by Rameses II. and erected in Alexandria became known as Cleopatra's Needles. One of these was erected in Central Park, New York, and the other in London, England, both being presented to the respective governments by the khedive of Egypt. Formerly obelisks were very common in Egypt, but at present only forty-two erected in that country are known. This number includes the two taken to Paris, in 1833 and in 1836, five taken to England, one to the United States, and those erected in Berlin, Rome, Florence, Vienna, and other European cities. Among the most famous obelisks of American construction are the Washington monument, at Washington, and the Bunker Hill monument. The latter is thirty feet square at the base, 231 feet high, and was dedicated in 1843 to commemorate the battle of Bunker Hill, which took place June 17, 1775; and the former is fifty-five feet square at the base, 555 feet high, and was dedicated in 1885.

OBER-AMMERGAU (ō'bẹr-am'er-gow), a town of Germany, situated in the valley of the Ammer, in Upper Bavaria, about forty-five miles southwest of Munich. The inhabitants are employed principally in the manufactures of rosaries, crucifixes, images of saints, and toys. The town is noted on account of the celebrated miracle play in which the passion of our Saviour is represented. These passion plays are given on Sundays of the summer months on stages erected in shaded places, and every ten years there is a special exhibit, to which many thousands of European and American visitors are attracted. The custom of presenting the play every tenth year as a special feature dates from 1633, when the inhabitants were grateful for escaping the ravages of a plague and vowed that the performance should be given periodically. The passion play, when given in its entirety, requires 350 actors. However, in late years the exhibit has taken on a form of profit production. The last special exhibit was given in 1900, when the clear profit to the promoters was $750,000, and the gross railroad receipts on account of the passion play were $1,500,000. See **Miracle Plays**.

OBERLIN (ō'bẹr-lĭn), a town of Lorain county, Ohio, thirty-five miles west of Cleveland. It is well connected by a number of excellent railroads, has good municipal facilities, and is noted particularly because of its being the seat of Oberlin College. This educational center was founded in 1833 as a private institution, and in 1850 was chartered in its present name. Oberlin College is co-educational and non-sectarian, has a valuable herbarium and museum, and a library of 50,000 volumes. It is amply endowed with productive funds, has ninety instructors, and is attended by 1,350 students. In 1900 the town had a population of 4,082.

OBERLIN, Johann Friedrich, eminent minister, born in Strasburg, Germany, Aug. 31, 1740; died June 1, 1826. He received a liberal education and became pastor of Waldbach in 1766, where he spent his entire life in ministering to the spiritual wants of his congregation. The region had suffered materially from the Thirty Years' War, and the people had sunk into poverty, but Oberlin employed practical means to secure the adoption of improved methods of education, fostered agricultural arts, and encouraged different branches of manufacture. He also established a number of primary schools and several libraries, and by his active interest in the material industries caused the village to increase from 500 to nearly 5,000 inhabitants. The labors of Oberlin were confined to a small town, but his devoted religious and industrial work became known in many portions of the world, and gives evidence of what can be done by those devoted in a persevering manner to a laudable enterprise.

OBI (ō'bē), or **Ob**, a river of Siberia, one of the largest of Asia. It rises in the Altai Mountains, and flows in a general course toward the northwest until it receives the Irtish River, when it makes a turn toward the north and flows into the Gulf of Obi. The Obi has a total length of 3,000 miles and

drains an area of 1,200,000 square miles. Near Bogorovsk it is crossed by the Russian trans-continental railway. It flows through a valley of marked fertility, but the region traversed by it has a rigid climate. It is utilized extensively as a commercial route.

OBSERVATORY (ŏb-sĕrv'ā-tō-rў), an institution or building fitted with optical instruments and designed for systematic observation of physical and astronomical phenomena. Observations were devoted exclusively, until comparatively recent times, to making a study of astronomical aspects, though in some cases a loose account of weather was recorded. Later provisions were made to observe meteorological phenomena and terrestrial magnetism. The Chinese were among the first to record observations in relation to astronomical study, and the Egyptian pyramids are thought to have been constructed in harmony with certain stellar phenomena, though it can scarcely be said that observatories existed anywhere prior to about 300 B. C. In that year Ptolemy Soter caused the erection of an observatory at Alexandria, which continued in existence for about 400 years. Hipparchus investigated the motions of the sun, planets, and moon in the Alexandrian observatory, and discovered the precession of the equinoxes. In the 9th century A. D. observatories were built by the Arabians at Bagdad and Damascus, and in 1260 a splendid institution of a like character was founded in Maragha, in the northwestern part of Persia.

Bernhard Walther built the first observatory in Europe, at Nuremberg, Germany, in 1472, and the revival of practical astronomy properly dates from that time, since many of the newer methods of observation were invented by professors of that institution. Tycho Brahe established two observatories on the Danish island of Huen in the 16th century, and Landgrave William IV. built a similar institution at Cassel, Germany, in 1561. These institutions gave an impetus to astronomical interest and facilitated observations by introducing valuable improvements in astronomical apparatus. They caused many universities to found observatories as adjuncts to their institutions. The principal observatories in foreign countries were founded as follows: Royal Observatory at Paris, 1667; Greenwich Royal Observatory, 1675; Tuscalan Observatory, near Copenhagen, 1704; Berlin Observatory, 1705; St. Petersburg, 1725; Vienna, 1756; Oxford, 1772; Edinburgh, 1776; Dublin, 1783; Konigsburg, 1813; Sydney, 1820; Cape of Good Hope, 1820; and Pultova, near St. Petersburg, 1839. In the United States are several excellent observatories, among them those at Cambridge, founded in 1839; Washington, 1842; Ann Arbor, 1854; Lick Observatory, in California, 1888; and Yerkes Observatory, at Lake Geneva, Wisconsin, 1897. There are also several excellent observatories in Mexico, Chile, Brazil, and other Central and South American countries.

The telescope is the chief instrument used in observatories. It contains the largest lens manufactured for optical observation. Other instruments used in the larger observatories include the barometer, micrometer, chronometer, circle, and clock. They also employ photography, photometry, and spectrum analysis. The national observatories, in addition to making observations, communicate intelligence regarding them and probable changes in climatic conditions to various portions of the country. Observatories are usually built on prominent elevations. The employment of large telescopes necessitates the construction of substantial buildings, and the instruments are usually mounted in such a manner that they rest securely on foundations built especially for their support.

OBSIDIAN (ŏb-sĭd'ĭ-*an*), a volcanic rock consisting of lime, or potash, and silicate with alumina and iron, and generally found in connection with feldspars. It has a glassy appearance and is brittle and hard. The color usually is black, but sometimes brown, green, red, or variously striped. It occurs in several regions of Mexico, South America, Iceland, and Eurasia. The early peoples of Peru and Mexico employed it in the manufacture of ornaments and cutting weapons, while others used it for arrowheads, utensils, and mirrors.

OCEAN. See **Sea.**

OCELOT (ō'sĕ-lŏt), a class of carnivorous mammals native to the warmer parts of America, and commonly called tiger-cat.

OCELOT.

There are several distinct species, varying somewhat in size. They are generally characterized by fur of a tawny-yellow or reddish-gray color, marked with spots of black or brown, and are noted for their blood-thirsty disposition. The ocelot is about three feet long, has a tail of about eighteen inches, and is native from Arkansas to the southern part of Paraguay. It is found mostly in the larger forests, where it is seen frequently in the act of climbing trees. Its food consists mostly of birds and small quadrupeds.

OCHRE (ō'kĕr), an earthy oxide employed with oil as a paint. It occurs in deposits, usually about springs that flow from mountains, or rocky beds which contain iron

pyrites in a decomposed state. The color is not uniform, varying with the degree of oxidation of the iron, but it may be changed by heat from its usual yellowish color to brown or red. In the United States the production of ochre amounts to above 3,500 tons annually, the largest output being in Pennsylvania, Vermont, and Georgia, but there are deposits in many other regions of the country, especially in Missouri and New York. The leading ochre-producing countries of the world take rank as follows: France, Great Britain, the United States, Germany, and Cyprus.

OCMULGEE (ŏk-mŭl'gē), a river of Georgia, rises near Atlanta. After a course of about 225 miles toward the south and east it joins the Oconee in forming the Altamaha River. Its valley is fertile and contains extensive forests. On its banks are several thriving cities, of which Macon is the most important. It is navigable for 125 miles. The Little Ocmulgee is its principal affluent.

OCONEE (ō-kō'nē), a river of Georgia, rises in the northeastern part of the state, near Athens. It flows toward the southeast, and at its confluence with the Ocmulgee forms the Altamaha. Its length is about 240 miles, and it is navigable to Milledgeville, about one hundred miles.

O'CONNELL (o-kŏn'nĕl), **Daniel**, noted agitator, born in Kerry county, Ireland, Aug. 6, 1775; died in Genoa, Italy, May 15, 1847. He descended from a respectable family, and studied at the colleges of St. Omer and Douai, where he showed remarkable ability. In 1794 he entered Lincoln's Inn as a law student and in 1798 was called to the bar, establishing soon after a successful law practice. He soon became involved in Irish politics, advocating the dissolution of the union with England, though he kept within constitutional limits in advocating reforms. To make his efforts more effective he promoted the organization of a Catholic association, whose object was to secure the emancipation of Catholics, and in 1829 he became a member of parliament. There he advocated free trade in corn, favored universal suffrage, Negro emancipation, and greater civil rights for the Jews, and was conspicuous in urging the Catholic claims. In the latter he succeeded in securing the support of the duke of Wellington and Sir Robert Peel. He was reëlected to parliament in 1830, and continued a member of that body until his death, though he was elected from different localities at various times.

In 1840 O'Connell began to develop his policy by holding meetings throughout Ireland, for which purpose he traveled from place to place, and everywhere was greeted by enormous crowds. His efficient and skillful work so aroused the people of Ireland that an almost universal sentiment in favor of separation from England became manifest, and this so affected the government of Sir Robert Peel that it was determined, in 1843, to suppress further agitation. Accordingly an army of 35,000 men was sent to Ireland, and O'Connell and a number of others were placed under arrest and sentenced to imprisonment with a fine of $10,000, but, after remaining in prison for fourteen weeks, the house of lords set aside the judgment. His health became impaired during the imprisonment, and dissentions arose in his party because he refused to use force in the battle for independence, maintaining all the time that the better way for Ireland to secure independence was by moral suasion. In 1847 he went to Italy in search of lost health, but died soon after reaching Genoa. O'Connell was an eloquent and popular speaker. His speeches were almost exclusively extemporary. Few men have been more able and conscientious in advocating political and personal independence, and none have held a warmer place in the hearts of the Irish people. He published "A Memoir of Ireland" and "Native and Saxon."

O'CONNOR (o-kŏn'ẽr), **Thomas Power**, statesman, born in Athlone, Ireland, in 1848. He studied at Queen's College, Galway, and Queen's University, Cork, and engaged in newspaper writing for the "London Daily Telegraph" and other periodicals. In 1880 he was elected a member of parliament from Galway, where he became a prominent member of the Parnell party, and served as an official of the Land League. He lectured in the United States in 1881, and in 1883 became president of the Irish National League of Great Britain. O'Connor attained a very influential position in parliament during his long service, and is also known by his able editorship of the "London Sun." His principal writings include "Biography of Lord Beaconsfield;" "Cabinet of Irish Literature," and "The Parnell Movement."

OCONTO (ō-kŏn'tō), county seat of Oconto county, Wisconsin, on Green Bay, at the mouth of the Oconto River, 145 miles north of Milwaukee. In its vicinity is a fertile agricultural country, which produces cereals and grasses. It has good railway connections, and enjoys a large trade in lumber and merchandise. Among the manufactures are ironware, wagons, flour, furniture, and machinery. Electric lights, a fine courthouse, and several school buildings are among the improvements. Population, 1900, 5,646.

OCTAVIA, daughter of Caius Octavius, sister of Emperor Augustus, and wife of Claudius Marcellus. Her husband died in 41 B. C., and the following year she married Mark Antony, presumably with the view of securing a friendship between him and her brother. She possessed a high character and remarkable beauty, though these were not sufficient to lead Antony to forget his former love for Cleopatra. In 36 B. C. Antony met Cleopatra while engaged in the

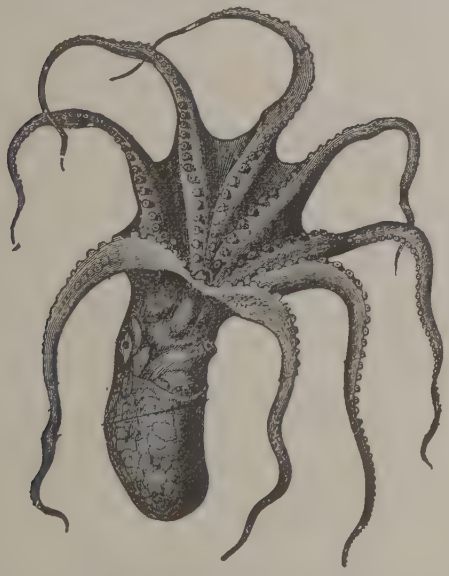
Parthian War, and, when Octavia brought money and troops for his assistance, he refused to meet her and bade her return to Rome. He finally divorced her in 32 B. C., but she showed a devoted fidelity by providing for the education of her children. After the death of Antony she also cared for the children of Cleopatra with marked devotion. Her death occurred in 11 B. C. She was buried by the state with the highest honors. Octavia had two daughters by Antony and three children by Marcellus, and from the former descended Emperors Caligula, Claudius, and Nero.

OCTAVIANUS. See **Augustus.**

OCTAVO (ŏk-tā′vō), a term used in bookbinding, having reference to a sheet of paper being folded so as to make eight leaves. It is used to designate a book printed with eight leaves to the sheet, and is written 8vo. Since the size of the paper employed varies there are different designations, as demy 8vo, imperial 8vo, and foolscap 8vo.

OCTOBER. See **Months.**

OCTOPUS (ŏc′tō-pŭs), a genus of fishes belonging to the cephalopod group, and also known as cuttlefishes. They have a warty,



COMMON OCTOPUS.

oval body, eight arms of unequal length, and include forty-six known species. Octopi are found on the Pacific coast of North America, in the Mediterranean, and other waters, and mostly frequent rocky coasts, where they feed on mollusks and crustaceans. The arms or tentacles in the common octopus measure from eight to fifteen feet, while the body is about nine feet long, thus enabling the animal to spread itself to a distance of from twenty-five to thirty-five feet. Each arm has a series of suckers, by which they seize their prey and moor themselves to the bottom of the sea. In some species the weight reaches from sixty to seventy pounds, but specimens found in the tropical waters of America weigh 250 pounds. The flesh has a reddish color, and is useful for bait, though in some countries on the Mediterranean several species form a favorite article of human food. They have the remarkable characteristic that the color of the flesh changes somewhat with the temper of the animal, and, when pursued by an enemy, they emit an inky substance that colors the water somewhat and enables them to evade capture. The female deposits its eggs on empty shells and seaweed, where they are guarded against enemies. Most of the species of octopi are timid, inoffensive, and solitary, but all are active and voracious.

ODD-FELLOWS, one of the most extensive social institutions in the world. It dates officially from 1812, when it was instituted at Manchester, England, though the oldest lodge of Odd Fellows was organized in 1745. The first lodge instituted in the United States dates from 1819, and the grand lodge of Maryland was established in 1821. The American society severed its connection with the Manchester Unity in 1842, and the headquarters for Canada and the United States are now at Baltimore. It has steadily increased in membership and has connected lodges in all the continents. Its membership in the United States aggregates 1,250,000.

ODER (ō′dẹr), an important river of Germany, rising in the Obergebirge, in Moravia. It has a northeasterly course until after it enters Germany, when it turns toward the northwest and flows into the Baltic Sea by three channels. The Oder has a length of 550 miles, drains a basin of 50,000 square miles, and serves as an important route for commercial navigation, though much expenditure of revenues was necessary to overcome several of its rapids. Its valley is highly fertile and contains great wealth. It has a number of important tributaries, including the Neisse, Warthe, and Mietzel. The principal cities on its banks are Stettin, Frankfort, Glogau, Breslau, Oppeln, and Ratibor. It is navigable to Breslau for vessels of fifty tons and for small craft to Ratibor.

ODESSA (ō dĕs′sạ), a city of Russia, in the government of Kherson, on the Black Sea, nearly midway between the mouths of the Dniester and Dnieper rivers. It has a fine location on the Bay of Odessa. The two harbors are protected by moles and afford secure protection for its large foreign trade. Among the manufactures are machinery, cotton and woolen goods, chemicals, tobacco products, flour, oil, leather, sailing vessels, soap, and utensils. Railroad connections facilitate interior trade, though its importance is due principally to its large export commerce in sugar, flour, cereals, wool, lumber, coal, iron, flax, hemp, and merchandise. Among the improvements are electric lights, street railways, substantial

pavements, an extensive public school system, and a number of fine educational institutions. The University of Odessa was founded in 1865. It has seventy-five professors, 850 students, and a library of 160,000 volumes. The city also has a number of fine churches, a public museum, several cathedrals, government buildings, public parks, and numerous monuments. It is a modern city. The first building was a Russian fortress, erected in 1793, and around it the city was built. Its prosperity dates from 1803, when its harbor and wharves were improved, and later railroad construction opened an important trade with Austria, Germany, France, and other countries toward the west. About one-fourth of the inhabitants are Jews, but there are also many Turks, Greeks, and Germans. Population, 434,280.

ODIN (ō′dĭn), in Scandinavian mythology, the divinity who is accredited with the creation of the world, and regarded the ruler of both earth and heaven. He is thought to have his principal seat in Asgard, where two ravens, known as Hugin and Mumin, the personifications of thought and memory, bring him tidings of all events occurring on earth. He is assigned supreme power over the fortunes of war. When governing military contests or deciding in regard to the valor of warriors, he is seated in his court in Valhalla, where he is joined by worthy warriors after their decease. It is related that while drinking from Mimur's fountain he lost an eye, but was recompensed by being converted into the wisest god, and later he secured Frigga for his queen. His Germanic name is Woden, and from it the fourth day of the week, Wednesday, was named. Odin ruled originally in Scythia, near the Black Sea, but was driven out of his territory and conquered northern Europe and Scandinavia.

ODOACER (o-do-ā′sẹr), the first ruler of Italy after the downfall of the Western Empire, born in the region of the Middle Danube about 434; slain March 15, 493. He descended from German parents, his father being Edico, chief of the Scyrri tribe. It is thought that he entered the service of the allied Germanic tribes about 464, and later served for a time under Attila, king of the Huns. Soon after he became chief of a formidable confederation of barbarians. He led a vast horde of barbarians against Romulus Augustulus, whom he defeated in 476, and at once succeeded as king of Italy the last of the Roman emperors. As a matter of policy he wrote a letter to Emperor Zeno, ruler of Byzantium, declaring that he had confidence in the civil and military integrity of his government, and in turn the Byzantine emperor conferred upon him the title Patricius. Odoacer established his capital at Ravenna, where he was attacked repeatedly by Theodoric, king of the Ostrogoths, and after a number of years was compelled to surrender his army to his opponents, who immediately assassinated him. The reign of Odoacer was wise and vigorous, but the extreme factional divisions of his time made it impossible to unite successfully the people into one nation for the practice of the arts of peace.

ŒDIPUS (ĕd′e-pus), a popular hero of Greek mythology, son of King Laius of Thebes and Jocasta. An oracle told the king that he would perish by the hand of his own son, and, to escape such a fate, he determined to destroy the infant. Accordingly the babe's feet were bound together, and he was handed to a servant with instructions to expose him on Mount Cithæron, but, instead, the servant gave the child to a shepherd, who later gave him in charge of the Corinthian king, at whose palace he was reared to manhood. Œdipus supposed that he was the son of the king, but when informed at a banquet that he was not, he repaired to Delphi to consult the oracle, and there was informed that he was fated to kill his father and to marry his own mother. Dismayed by the information, he decided to proceed to Bœotia. While en route he met a chariot on the highway, and, when ordered to give all the way, a quarrel ensued in which the occupant of the chariot was killed, and Œdipus fled from the spot without learning that the slain man was his father, King Laius of Thebes. The kingdom of Thebes was offered to the person who would solve the riddle of the Sphinx, and he was also to become the husband of the queen. When Œdipus was asked, "What being has four feet, two feet, and three feet, and only one voice, but whose feet vary, and when it has the most is weakest?" he answered promptly, "Man." The solution being correct, the Sphinx fell from her foundation, and he became the king of Thebes and the husband of Jocasta. The country enjoyed great prosperity and tranquility under Œdipus, and there were four children born to the union, two sons, Polynices and Eteocles, and two daughters, Ismene and Antigone. Later the country was devastated by a pestilence, and, when Œdipus consulted the oracle for the author of the crime, he was given this answer: "Thou thyself are the murderer of the old King Laius, who was thy father; and thou art wedded to his widow, thy own mother." Horrified at this revelation, he deprived himself of his own sight, and Jocasta hanged herself in despair. Œdipus became a homeless outcast, but was never forsaken by his daughter Antigone, who cared for him with faithful devotion in the grove of Eumenides. Poets have used the story of Œdipus to illustrate the power of fate over man, and it has been made the subject of tragedies by Dryden, Voltaire, Corneille, Chenier, and many other noted writers.

OEHLENSCHLAGER (ö′le̤n-shlā-ge̤r), **Adam Gottlob**, noted poet, born in Copenhagen, Denmark, Nov. 14, 1779; died Jan.

20, 1850. He spent his early life at the royal palace of Fredericksburg, where his father was steward, and attended several educational institutions of Copenhagen. His first verses were written when he was twelve years old, and in 1803 he published a volume of poetry, in which appeared the play, "Eve of St. John." He mastered the German language by studying and traveling in Germany, and later translated many of his works into that tongue. Among his chief writings are "Axel and Valborg;" "Palnatoke;" "Canute the Great;" "Land Found and Lost;" "Gods of the North," and "Varangians in Constantinople." He also made many translations into the Danish from various European languages.

OELWEIN, a city of Iowa, in Fayette county, about fifty-six miles west of Dubuque. The surrounding country is fertile, producing cereals, vegetables, and fruits. It has excellent railroad conveniences, a growing trade in live-stock and merchandise, and is the seat of important railroad shops. Among the manufactures are cigars, earthenware, and machinery. The notable buildings include several fine schools and churches. It has modern municipal improvements. Population, 1900, 5,142.

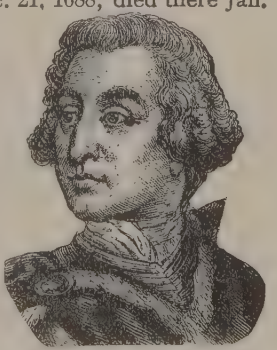
OFFENBACH (of'ẹn-bäk), **Jacques**, musical composer, born in Cologne, Germany, June 21, 1819; died Oct. 5, 1880. He descended from Jewish parents, studied music from an early age, and in 1833 entered the Paris Conservatoire as a student. In 1834 he was admitted as a violoncellist to the Opera Comique, and soon attained to much popularity with Parisian audiences. He became conductor of the Theatre Francais in 1847, and subsequently leased the Theatre Comte, which he reopened as the Bouffes Parisiens. Most of his operas are classed as comic, and include numerous popular productions, many of which still hold a high place in European and American countries. Among the most noted are "La Belle Helene;" "Genevieve of Brabant;" "Grand Duchesse;" "Madame Favart;" "Princess of Trebizonde," and "Orphee aux Enfers."

OGDEN, a city of Utah, in Weber county, situated at the confluence of the Ogden and Weber rivers. It occupies a beautiful site 4,325 feet above sea-level, and has connections with other cities by important railroads. Among the improvements are electric lighting, water works, pavements, and street railways. It has manufactures of canned fruit, clothing, flour, brooms, dairy products, machinery, ironware, and earthenware. There are several excellent school buildings. It is the seat of a military academy, the Ogden Academy, and the University of Utah. Ogden has a fine Mormon tabernacle and a number of churches. The surrounding country is agricultural and mining, producing cereals, grasses, fruits, and precious minerals. Its healthful climate makes it a favorite resort for invalids and tourists. In the vicinity of Ogden are thermal springs of value in the treatment of rheumatism, scrofula, and other diseases. Population, 1900, 16,313.

OGDENSBURG (ŏg'dĕnz-bûrg), a city of New York, in St. Lawrence county, on the St. Lawrence River, seventy miles below Lake Ontario. It is a United States port of entry, has convenient railroad and steamboat connections, and is the seat of a large trade in lumber, grain, and other produce. Among the manufactures are leather goods, flour, machinery, lumber products, and hardware. The city has fine school and church buildings, several parks, waterworks, pavements, and electric street railways. The British captured it in 1813. Population, 1900, 12,633.

OGLESBY (ō'g'lz-bў), **Richard James**, statesman, born in Oldham, Kentucky, July 25, 1824; died in Elkhart, Illinois, April 24, 1899. He was the son of a farmer, removed to Illinois in 1836, and in 1845 was admitted to the bar in Springfield. He enlisted at the beginning of the Mexican War and participated in the battles of Cerro Gordo and Vera Cruz. From 1849 to 1851 he worked in California as a gold-seeker, and returned in the latter year to Illinois with $4,500. He became a state senator in 1860, but soon after resigned to enter the Union service in the Civil War, and took part in the battles of Fort Henry, Fort Donelson, Shiloh, and Pittsburg Landing. At the siege of Corinth he was severely wounded, and was off duty until in April, 1863. The following year he resigned his command, after having been made major-general. In 1864 he became governor of Illinois and was reëlected in 1872, and served as a republican in the United States senate from 1873 to 1879. He was elected governor a third time in 1884, and after the expiration of his term, in 1889, retired to his farm near Elkhart.

OGLETHORPE (ō'g'l-thorp), **James Edward**, founder of Georgia, born in London, England, Dec. 21, 1688; died there Jan. 30, 1785. He was a British army officer, served as a member of parliament for thirty years, and in 1732 secured a grant of land for the purpose of establishing a colony for unfortunate debtors. In 1733 he founded Savannah, Georgia. The settlement was fairly prosperous and he induced a number of German Protestants to seek refuge there. Parliament made a grant of $50,000 to further the enterprise. In 1741 he



JAMES E. OGLETHORPE.

commanded an expedition against the Spanish settlements at St. Augustine, but was repulsed, and the following year his colony was attacked unsuccessfully by a Spanish force. He returned to England in 1743, where, in 1752, he resigned the charter of Georgia to the crown.

OGOWE (ō-gō-wā'), or **Ogobay**, a river of West Africa. It rises near the southern boundary of Cameroon, and after a course of about 400 miles toward the southwest, flows into the Atlantic Ocean near Cape Lopez. It is characterized by a number of rapids and cataracts, and it enters the ocean by an extensive delta. In the dry season it becomes a narrow current, but during the rainy period it assumes such an immense size that it was long thought to be one of the leading arteries of Africa. Du Chaillu explored the river in 1857, and soon after a number of French stations and missions were established in its valley. A large part of the Ogowe basin is fertile, producing tobacco, fruits, cereals, and grasses.

OHIO, a large river of the United States, formed at Pittsburg, Penn., by the junction of the Monongahela and Allegheny rivers. After a course of 975 miles toward the southwest it joins the Mississippi at Cairo, Illinois. The river is navigable in its entire course from Pittsburg, being 600 yards wide at that city, and it drains a basin of 214,000 square miles. It forms the southern boundaries of the states of Ohio, Indiana, and Illinois; the northern boundary of Kentucky, and the northwestern boundary of West Virginia. Its principal northern tributaries include the Muskingum, Scioto, Miami, and Wabash; and its principal southern affluents are the Great Kanawha, Big Sandy, Licking, Kentucky, Green, Cumberland, and Tennessee. The important cities on its shores include Evansville, New Albany, Louisville, Cincinnati, Portsmouth, Marietta, Wheeling, Cairo, and Pittsburg. As a waterway the Ohio is of vast importance, and its valley is noted for great fertility. It is the largest eastern tributary of the Mississippi.

OHIO, a north-central state of the United States, bounded on the north by Lake Erie and Michigan, on the east and south by Pennsylvania, West Virginia, and Kentucky, and on the west by Indiana. Its length from east to west is 223 miles, width 210 miles, and area 41,060 square miles, about the size of New Jersey and Maine. The drainage is principally toward the south, the chief rivers being the Ohio, Muskingum, Scioto, and the Great Miami; while the northern part is drained into Lake Erie by the Maumee, Sandusky, and Cuyahoga. As a whole, the state has an undulating surface, being quite hilly in the northeastern part, though its general elevation is only from 425 to 1,550 feet above sea-level. The river valleys are particularly fertile, though the soil is generally productive and the climate favorable. It has an average annual rainfall of thirty-nine inches, with an abundance of snow in the northern part. There are frequent changes in temperature, variable winds, and a mean temperature of about 54° in the southern part and 48° in the northern.

Ohio has a coal area covering about 12,500 square miles, and the annual production is valued at $15,500,000. The coal is an excellent grade of bituminous formation, varying in thickness in the productive fields from four feet to a maximum of fourteen feet, the most extensive mines being in Hocking, Athens, Jackson, Guernsey, Belmont, and Perry counties. The state also produces a large quantity of salt, taking rank next to Kansas in the production of that commodity. Other minerals include iron ore, limestone, sandstone, and several kinds of clay. Mineral oils and natural gas are found in abundance, particularly in the northeastern part of the state. Its manufactures are gaining constantly in importance, owing partly to its favorable situation on principal transportation lines, and partly to its mineral wealth. Among the products are machinery, cotton and woolen goods, spirituous liquors, carriages and wagons, glass, pottery, refined oil, flour, tobacco and cigars, nails, pig-iron, engines, and utensils. There is also a considerable production of maple sugar, molasses, brooms, and fruit products.

Agriculture is an extensive industry in all parts of the sate, the annual production of corn being valued at $35,500,000; wheat, $7,600,000; oats, $9,500,000; potatoes, $5,275,000; hay, $17,150,000. It also has considerable productions of rye, barley, buckwheat, garden vegetables, broom corn, and tobacco. Fruits are abundant, including small fruits, peaches, apples, quinces, pears, cherries, and other varieties. The live-stock comprises horses, milch cows, other cattle, sheep, swine, goats, and considerable poultry. Originally the state was covered quite largely with forests, and a considerable portion of the timber has been preserved and other varieties cultivated. The forest trees embrace maple, spruce, tamarack, pine, cypress, elm, oak, sycamore, ash, ironwood, cottonwood, walnut, box-elder, chestnut, mulberry, and other hardy varieties. There are excellent facilities for transportation. Lake Erie contains a number of excellent harbors, and there are several extensive canals, with a considerable mileage of river navigation. The railroads include a total of 9,150 miles, giving the state fourth rank in railroad mileage.

The educational welfare of the state has been amply provided for from its early settlement. There are common schools in all sections of the state, with high schools in the towns and cities, and an exceptional number of excellent public and private institutions of higher learning. Five public normal schools are maintained, and normal training is given in fifteen colleges and sixty

public high schools. The Ohio State University is located at Columbus, where it was founded in 1862 with funds received from the sale of public lands. It is maintained by annual appropriations, has advanced courses of study, a fine library and equipments, and is attended by about 1,250 students. The state has a splendid system of private institutions of higher learning, among them the Ohio Wesleyar University, Delaware; Ohio University, Athens; Calvin College, Cleveland; Mount Union College, Alliance; University of Wooster, Wooster; University of Cincinnati, Cincinnati; Oberlin College, Oberlin; Western Reserve University, Cleveland; Lima College, Lima; Capital University, Columbus; St. Joseph's College, Cincinnati; Urbana University, Urbana; Twin Valley College, Germantown; Otterbein University, Westerville, and Buchtel College, Akron. The state maintains an excellent system of public institutions for the care of the aged, deaf and dumb, feeble-minded, blind, orphan children, and incorrigibles. Organizations are maintained by all the leading religious denominations, and there are 8,950 church edifices. The publications include 1,250 periodicals, of which 165 are dailies and 815 weeklies.

Ohio was formed from the Northwest Territory. French fur-traders visited the region as early as 1670, and the following year it was formally claimed as a possession of France. Both France and England made claim to the whole region at the time of the French and Indian war, and the treaty of Paris in 1763 gave the region as far west as the Mississippi to the English. The southern part of the state was claimed by Virginia and the northern part by Connecticut, and in 1783 the former ceded its interest to the general government, while the latter made a similar cession in 1786, but retained ownership of the lands that afterward became known as the Western Reserve. In 1787 an act was passed by congress for the government of the Northwest Territory, and General Putnam founded a settlement at Marietta in 1788. Settlements followed rapidly until in 1791, when a war broke out with the Indians, who were finally subdued by General Wayne in 1794 Ohio was set off under a separate government in 1800, and on Feb. 19, 1803, it was admitted as a state.

The state gave loyal support to the Union in the War of 1812, when the British were repulsed at Fort Meigs, and sent a large number of soldiers to the Civil War and to the Spanish-American War. It is popularly called the Buckeye State. Columbus is its capital. Among the principal cities are Cleveland, Cincinnati, Columbus, Toledo, Dayton, Youngstown, Springfield, Akron, Canton, Zanesville, Findlay, Sandusky, Hamilton, Lima, Newark, Mansfield, Steubenville, Portsmouth, Chillicothe, East Liverpool, Ironton, Tiffin, and Massillon. The state ranks fourth in wealth and fourth in population, being exceeded only by New York, Pennsylvania, and Illinois. It is rapidly developing its vast institutions to increased efficiency. The census of 1900 shows its population to be 4,157,545, including a colored population of 97,341, or 2.3 per cent. Of this number 371 are Chinese and 96,901 Negroes. The male population is somewhat in excess, equaling 50.6 per cent.

OHM (ōm), **George Simon**, eminent physicist, born in Erlangen, Germany, March 16, 1787; died July 7, 1854. He studied at Nuremberg and Munich, giving particular attention to galvanism. In 1817 he became professor of mathematics at the Jesuit College in Cologne, and in 1833 was chosen to a like position at Nuremberg. Subsequently he was professor of physics in Munich. He is the discoverer of the important law in electricity that the current which passes through any circuit is directly proportional to the electro-motive force acting on that circuit, and inversely proportional to the resistance of the circuit. The ohm, the unit of resistance to the passage of electricity that approximately equals the resistance offered by two miles of ordinary trolley wire, was named after him. He published a number of excellent works on the sciences, among them "Chain of Galvanism;" "Basis of Physics," and "Elements of Analytical Chemistry."

OIL CITY, a city of Pennsylvania, in Venango county, on the Allegheny River, 132 miles north of Pittsburg. It is surrounded by a productive oil and coal region, has good railroad facilities, and enjoys a large trade in oil and merchandise. Among the manufactures are engines, steam boilers and pipes, machinery, vehicles, cigars, hardware, and refined oils. The city has good schools, a city hospital, and a public library. Waterworks, pavements, electric lighting, and street railways are among the improvements. Population, 1900, 13,264.

OILS, a generic term used to describe various neutral liquids, usually of either animal or vegetable origin, but sometimes of mineral origin. The oils are lighter than water. They are insoluble in water, but sometimes soluble in alcohol, and always in ether. They take fire when heated in air, and give off a luminous flame when burning. Animal and vegetable oils are divided according to their properties into volatile or essential oils, and fatty or mixed oils. Essential oils are obtained chiefly by extracting the volatile principles of plants by distillation, and are used principally in medicine and perfumery, though they also enter extensively into the manufacture of varnishes and serve in the preparation of coloring matter. Chemically they are composed of hydro-carbons, or mixtures of hydro-carbons with compounds of hydrogen, carbon, and oxygen. Among the many essential oils are those known as the oils of cinnamon, anise, peppermint, nutmeg, mint, lime,

lemon, clove, lavender, thyme, orange, bergamot, marjoram, cajeput, chamomile, caraway, fennel, and many others.

Fatty oils penetrate paper and like substances. They communicate to paper a partial transparency and leave a permanent translucent grease-spot. The fatty oils from animals are simply the liquid portions of animal fat, but those of vegetable origin are obtained chiefly from seeds by pressure. These oils are composed principally of glycerids of palmitic, stearic, and oleic acids, and are subdivided into drying and non-drying oils. The drying oils are of vegetable origin and slowly absorb oxygen from the air, forming a varnish, and are used in the manufacture of paints and varnishes. The non-drying oils decompose on exposure to the air, when they change to a darker color and take on a disagreeable smell and taste. They are used as food, in medicine, in soap making, and for many other purposes. Among the principal drying oils are the oils of walnut, linseed, candle nut, hemp, poppy, sunflower, sesame, and madia. The non-drying oils include those made of cotton-seed, olive oil, castor oil, rape oil, colza oil, and groundnut oil; and among the animal oils are included lard, butter, tallow, sperm oil, cod-liver oil, seal oil, neat's-foot oil, porpoise oil, train oil, shark oil, and many others.

The mixed oils enter largely into the foods and medicines, and are common sources of artificial light. They are also of service as lubricants. Butter is obtained from milk, tallow from the fat of sheep and cattle, and lard from that of swine. Neat's-foot oil is secured by extracting the fatty substances from the feet of cattle. Mineral oils form a class somewhat by themselves, and include oils distilled from shale, peat, and other mineral substances. This class of oils also includes petroleum. They are thought to have been formed by the decomposition of vegetable and animal matter, though some writers regard petroleum of purely mineral origin. Mineral oils are composed largely of carbon and hydrogen.

OIL WELLS. See Petroleum.

OJIBWAYS (ō-jĭb′wāz), or **Chippewas**, a tribe of Algonquin Indians found in the region of Lake Huron and Lake Superior by the early settlers of America. Their number was reduced greatly by warring with neighboring tribes, particularly with the Iroquois and Sioux. They sided with the French against the English, later joined Pontiac in his wars, and during the Revolution sided with the British. Peace treaties were made with them in 1785 and 1789. Subsequently they joined the uprising of the Miamis, but were reduced by General Wayne, and made another peace treaty in 1795. In the War of 1812 they were again unfriendly, but in 1817 they relinquished all their lands in Ohio, and by 1851 most of the tribe had been moved west of the Mississippi. This Indian tribe includes many who have advanced considerably in industrial and educational arts, and their history from the early settlement of America has been written in an interesting manner by several of their scholars.

OKA (ō′kä), an important river of Central Russia. It rises thirty-five miles south of the city of Orel, and after a tortuous course toward the northeast joins the Volga at Nijni Novgorod. The Oka is 750 miles long, flows through one of the most fertile regions of Russia, and is an important commercial route for 600 miles.

OKEECHOBEE (ō-kē-chō′bē), a large lake in southern Florida, being forty miles long and twenty-five miles wide, though its maximum depth is only about twelve feet. It receives the drainage from Lake Kissimmee and a number of other sheets of water by the Kissimmee River, and its outlet is into the Gulf of Mexico by the Caloosahatchee. Within the lake are a number of islands, and in the vicinity are extensive everglades. Much of the region has been redeemed by extensive drainage.

OKHOTSK (ō-kōtsk′), **Sea of**, an Asiatic inlet from the Pacific Ocean, situated east of Siberia, west of Kamchatka, and partly enclosed by the Koorile Islands. The Gulf of Tartary joins it with the Japan Sea. It is 990 miles long, 495 miles wide, and contains the large island of Saghalien. The principal inflow of fresh water is by the Amur River. There are extensive fisheries, but its commerce is limited on account of the extremely cold climate. It is quite deep, has no shoals or sand banks, and is subject to fogs and storms.

OKLAHOMA (ŏk-lä-hō′mą), a south-central territory of the United States, bounded on the north by Colorado and Kansas, east by Indian Territory, south by Indian Territory and Texas, and west by Texas and New Mexico. It has an area of 39,030 square miles, being somewhat larger than the combined areas of South Carolina and New Hampshire. The surface is an undulating plain, sloping generally toward the southeast. In some portions there are tracts of sandy and rocky lands, though as a whole it is arable and fertile. The rivers flow through exceedingly fertile valleys, and along their banks are fine belts of timber. An abundance of grasses is produced on the prairie lands. The climate is favorable and healthful in all portions, and in the eastern part it is especially delightful, being less liable to sudden changes than in the western part, and having a somewhat larger rainfall. There is an average temperature of about 58°, and the rainfall is thirty-six inches. The principal rivers include the Arkansas, Cimarron, Canadian, Red, and North Fork of the Canadian.

Oklahoma has an abundance of mineral wealth, and there are ample opportunities for the investment of capital for its still

larger development. The principal minerals include salt, copper, lead, iron, zinc, bituminous coal, asphaltum, sandstone, limestone, petroleum, and mineral oils. Both the climate and soil are favorable to the production of a large variety of cereal crops, fruits, and live-stock. Among the principal agricultural products are wheat, corn, cotton, hay, oats, barley, rye, tobacco, potatoes, castor beans, peanuts, sugar beets, and buckwheat. The live-stock includes horses, mules, cattle, swine, sheep, and poultry. Federal estimates place the area devoted to cotton culture at 260,000 acres, and the annual yield of castor beans at 135,000 bushels. Oklahoma has manufactures of carriages and wagons, tobacco products, cottonseed oil, cotton and woolen goods, ice, flour, machinery, boots and shoes, saddlery, and harness. Railroad building is tending to aid in the rapid development of the natural resources, there being lines through nearly all portions. At present the railroads aggregate 1,150 miles.

Educationally Oklahoma is making rapid strides, schools being maintained in all parts where settlements have developed. The common schools are supplemented by high schools in the towns and cities, and there are a number of private institutions of higher learning. The public university is at Norman; a college of agriculture and mechanical arts is at Stillwater, and normal schools are maintained at Alva and Edmond. The university at Norman was established in 1892. It has an adequate income under public grants and a fine library. Ample provisions have also been made for the care of insane, feeble-minded, aged, orphan children, deaf and dumb, and the incorrigible. A number of schools for Indians are maintained, the most noteworthy being the one situated at Chillocco. Religious denominations of all classes have a fine representation, with about 1,050 churches and 1,250 Sunday schools. At present 150 periodicals are published in Oklahoma, of which fifteen are dailies and 112 are weeklies.

It is thought that the first white man to visit the region included in Oklahoma was Don Diego de Penalosa, who in 1662 made a tour from the Gulf of Mexico to the regions beyond the Arkansas River. Title to it was secured by the United States in the Louisiana Purchase of 1803, and it was included with a large scope of country set apart for the Indians in 1834. The government purchased a strip of land lying between Texas and Kansas, generally known as "No Man's Land," in 1889, and this was added to the other lands now included with Oklahoma, the latter being detached from Indian Territory in 1890, when the territory of Oklahoma was formed. Subsequently the government purchased titles from the Indians, and in 1893 opened for settlement large tracts by proclamation. Immediately vast numbers of settlers rushed into the territory for the purpose of staking claims and forming settlements. The arable soil, fine climate, and vast resources made it a popular objective region for agriculturists and artisans. Its prosperity and development have been constant since settlements were made. It is popularly known as the Boomer's Paradise. Guthrie is its capital. Its principal cities include Guthrie, Oklahoma, Ponca, Kingfisher, Enid, Newkirk, Perry, El Reno, Shawnee, and Stillwater. The population, according to the census of 1890, was 61,834; in 1900, 398,331. This number includes a total colored population of 30,807, or 7.7 per cent., of which 18,831 are Negroes and 11,945 Indians. The percentage of males is given at 53.8.

OKLAHOMA, a city in Oklahoma, county seat of Oklahoma county, situated on the North Fork of the Canadian River, thirty miles south of Guthrie. It is conveniently connected by a number of railroads, has electric lighting, public waterworks, sewerage, and several excellent school buildings. Among the manufactures are machinery, utensils, textiles, and tobacco products. It has a growing trade in agricultural produce, lumber, live-stock, and merchandise. Oklahoma was founded in 1889, and within a month had 800 houses. It is one of the largest cities in that section of the United States. Population, 1900, 10,037.

OLAF (ō'läf), **St.**, king of Norway, born in 995; slain in battle July 29, 1030. He descended from Harald Haarfager, being the son of Harald, chief of the district of Granland, and was an ally of the Normans. In 1015 he deposed Eric and Sevend Jarl from the throne of Norway, and as the sovereign of that country became noted as an advocate of Christianity. His zealous persecution directed against the pagans caused many of his subjects to form an alliance with Canute the Great, king of Denmark, who landed in Norway in 1028. Olaf was compelled to flee to Russia, and in an attempt to recover the country, two years later, was slain in battle at Stiklestad. He was proclaimed the patron saint of Norway in 1164, and was made the hero of many popular sagas and mythical legends. In 1848 the Order of St. Olaf was founded in Norway. The honors of this order are bestowed by the king on those rendering valuable services to arts and sciences, and to the country.

OLBERS (ŏl'bĕrss), **Heinrich Wilhelm Mathaus**, physician and astronomer, born at Arbergen, Germany, Oct. 11, 1758; died in Bremen, March 2, 1840. He studied medicine at Göttingen, became a practicing physician at Bremen, and also devoted much time to the study of astronomy. His reputation for astronomical research became general in Europe in 1779, when he calculated the orbit of a comet that appeared that year. In 1802 he discovered the planet Pallas and in 1807 the planet Vesta. The comet named Olbers' comet was discovered by him in 1815, and he also discovered four

others of minor importance. He is the inventor of a method of calculating the velocity of falling stars, and discovered several interesting matters in relation to the origin of meteoric stones.

OLDCASTLE (ōld'kas'l), **Sir John,** nobleman and martyr, born in England in 1360; suffered martyrdom Dec. 14, 1417. He acquired nobility by marrying Johanna, an heiress of the noble family of Cobham, and was known as Lord Cobham. Henry IV. was his personal friend, and he attained to a reputation as a soldier and statesman, serving in the house of lords. In 1411 he accompanied the English auxiliaries sent to assist the duke of Burgundy in raising the siege of Paris laid by the duke of Orleans. Oldcastle gave material assistance to the reformatory work carried on by Wycliffe, and during the life of Henry IV. was sheltered by imperial protection, but Henry V. supported in a large measure the persecutions of the bishops. Later he was excommunicated and examined, when he made a confession of his religious opinion, and was accordingly imprisoned in the Tower. However, he soon made his escape to Wales, where he eluded his opponents for several years. In 1417 he was seized and brought to London, and, being unwilling to recant, was burned at the stake. His writings include "Twelve Conclusions Addressed to the Parliament of England."

OLDENBURG (ōl'dẹn-bûrg), a city of Germany, capital of the grand-duchy of the same name, twenty-five miles northwest of Bremen. The grand-duchy has an area of 2,480 square miles. It is celebrated for its fertility of soil and its intimate connections with the history of Germany. In ancient times it was occupied by Teutonic peoples who were later known as Frisians, and it was noted as a Protestant stronghold during the Reformation. The city has a fine palace, is connected by several important railroads, and contains a number of excellent scientific, military, literary, and educational institutions. Among the manufactures are leather, clothing, glass, machinery, and earthenware. Its public library has 150,000 volumes, and there are extensive collections of antiquities and manuscripts. The grand-duchy has a population of 393,075, and the city of Oldenburg 24,290.

OLDHAM (ōld'hạm), a city of northwestern England, situated in Lancashire, thirty-seven miles northeast of Liverpool. It is connected with other trade emporiums by a number of railroads, and is noted for its extensive manufactures and commercial trade. The manufactured products embrace cotton and woolen goods, leather, machinery, silk textiles, cordage, boilers, and engines. Linens were manufactured in Oldham as early as 1630, but its prosperity is due largely to the development of the extensive coal fields in its vicinity in 1760. Water-mills were established there in 1770. It is at present one of the most important cotton manufacturing centers of the world. Among the general facilities are a fine system of public schools, several parks, a city hall, public baths, electric lights, street railways, and other municipal facilities. Population, 144,360.

OLD POINT COMFORT, a village in Virginia, situated at the south end of Chesapeake Bay, near the mouth of the James River, about fourteen miles north of Norfolk. Near it is Fortress Monroe. It is noted for its scenery and as a popular watering and bathing resort. The village has a number of excellent hotels and other facilities. In 1862 it was almost totally destroyed on account of its proximity to Fortress Monroe, but it was rebuilt soon after the war.

OLD TOWN, a town of Penobscot county, Maine, on the Penobscot River, twelve miles north of Bangor. It has several railroads, waterworks, electric lights, and a number of schools and churches. Its extensive water power is utilized in various manufactories, such as mills and machine shops. There is a large trade in lumber and lumber products. Population, 1900, 5,763.

OLEAN (ō-lē-ăn'), a city of Cattaraugus county, New York, near the Allegheny River, seventy miles south of Buffalo. It is surrounded by a farming and dairying country, which also produces large quantities of mineral oil. The city has several railroads, good school and church buildings, and a public library. Waterworks and street railways are among the municipal facilities. There are manufactures of ironware, leather, flour, refined oil, machinery, and farming implements. It has a growing trade in farm produce and merchandise. Population, 1900, 9,463.

OLEANDER (ō-lē-ăn'dẽr), a class of

OLEANDER.

beautiful evergreen shrubs, known as rose laurel in France, and as rose bay in England. It is native to India, but is now nat-

uralized in many temperate and warm countries, though it requires protection during the winter. The leaves are opposite and lance-shaped, and when punctured exude a milky juice. The flowers grow in terminal clusters and are of a rose or white color. They have a beautiful appearance, though their smell is not particularly pleasant. The shrubs attain a height of from eight to ten feet, growing mostly in moist places, and the leaves and roots yield medical and poisonous properties. Several species are grown as house plants. They are easily propagated by cuttings, and are kept indoors during the winter.

OLE BULL. See Bull, Ole.

OLEOMARGARINE (ō-lē-ō-mär'gȧ-rĭn), also called margarine and butterine, an artificial butter originally made of pure beef-fat. It is now manufactured from milk, cream, neutral lard, oleo-oil, and pure butter, and after these ingredients are thoroughly worked together a coloring matter is added. The manufacture of butter from animal fat was first suggested in France by a chemist named M. Hippolyte Mege, where the process was patented, and it was subsequently introduced into the United States and other countries. However, the process varies to some extent, this depending upon the particular product desired, and machinery of considerable complexity is involved in the operation. The ingredients named above are those usually employed, the neutral lard being prepared from the leaf lard of the hog, and oleo-oil is made from the selected fat of the steer. These fats are the very best obtainable, and after the animal heat is removed, they are washed carefully and freed of the tissue and fibrin. They are next reduced to a liquid form by heating, when cream and milk are added and the whole mass is churned. The product depends upon the flavor and grade of oleomargarine desired. Usually a considerable per cent. of the finest quality of butter is added, and the whole is colored to resemble the dairy product.

Another process consists of preparing the purest fresh beef suet, which is the fatty tissue found in the region of the loins and kidneys of cattle and sheep, by cleansing it in lukewarm water and cutting it as fine as possible by machinery. The membranes of the fat cells are separated from the fat by heating the suet in large vats of water by means of steam to about 130° Fahr. Usually the entire bulk is allowed to rest about two hours while kept warm, in which time the particles of membrane settle and the fat floats as an oil. The oil is now drawn off and allowed to solidify, and it is next subjected to pressure. In this form it is known as expressed oleomargarine, and with it is mixed a quantity of milk and butter, and the whole is churned until the ingredients are mixed thoroughly. The goods are then worked and packed the same as pure butter made from cream, and put up in convenient packages. A law of congress requires that every package be carefully marked, so that consumers may be able to determine the oleomargarine from dairy butter. The manufacture of this product is now an important industry in the United States, and chemists have demonstrated its nutritive value to be practically identical with the dairy product.

OLGA, St., wife of the Russian duke of Igor of Kiev, and saint of the Greek Church. Her husband conducted an unsuccessful expedition against Constantinople and was slain, and in 952 she embraced Christianity, having previously assumed the government as regent for her minor son. After returning to Russia, she pursued with much diligence the work of introducing Christianity. She died in 978. Her festival dates from an early period. It occurs on July 11.

OLIPHANT (ŏl'ĭ-fȧnt), **Laurence,** traveler and novelist, born in England in 1829; died there Dec. 23, 1888. He was the son of Sir Anthony Oliphant, chief justice of Ceylon, and studied law at the University of Edinburgh, but did not practice after being called to the bar. He visited Russia in 1852, and soon after came to Canada as private secretary to the earl of Elgin, then governor-general, and later accompanied him on his embassy to China. In 1861 an assassin inflicted a dangerous wound upon him while in Japan, and he soon after resigned and returned to England, where he engaged as correspondent to several periodicals and was for some years a member of parliament. Later he joined T. L. Harris in attempting to found a socialistic community in Portland, New York, and after this enterprise failed, he settled at Haifa, near Mount Carmel, in Palestine. His writings include many excellent productions, among them "Russian Shores of the Black Sea;" "Minnesota and the Far West;" "Piccadilly;" "Episodes in a Life of Adventure;" "Land of Gilead;" "Transcaucasian;" "Campaign under Omar Pasha," and "Land of Khemi." He also published a work on spiritualism entitled "Scientific Religion."

OLIPHANT, Margaret, novelist and biographer, born near Musselburgh, Scotland, in 1820; died June 25, 1897. Her maiden name was Wilson, and she was by marriage related to Laurence Oliphant. After securing an education, she engaged in literary study, her first publication appearing in 1849 under the title of "Passages in the Life of Mrs. Margaret Maitland," being a work of fiction in which the life and character common to Scotland are delightfully delineated. This work attracted general attention, and she soon won fame as a contributor to "Blackwood's Magazine" and the publication of other novels. A pension of $500 was granted to her in 1868, and she was otherwise honored by recognition extended to her by a number of societies. Her writ-

ings embrace about thirty novels, fifteen other works, and many beautiful contributions to periodicals. The best known works include "Adam Graeme of Mossgray;" "Katie Stuart;" "Salem Chapel;" "Chronicles of Carlingford;" "Marriage of Elinor;" "Life of Laurence Oliphant;" "Joan of Arc;" "Heir Presumptive and Heir Apparent;" "He That Will Not When He May;" "Life of Edward Irving;" "Makers of Florence;" "Literary History of England from 1790 to 1825;" "Victorian Age of English Literature," and "Royal Edinburgh."

OLIVE, a genus of evergreen trees and shrubs found in the warmer regions of temperate climates. They attain to a height of

COMMON OLIVE.

from fifteen to thirty feet. The leaves are lanceolate or oblong, have a smooth surface above but horny beneath, and are bluish or dusky-green in color. The flowers are small and whitish, growing in racemes or clusters, which are terminal. There are several species, most of which are native to Syria, but they have been acclimated extensively in Eurasia, western and southern Europe, and various regions of America, particularly in the states south of North Carolina and on the Pacific coast. The olive tree bears a fruit of oblong-spheroidal form, with a thin, smooth skin and a hard stone. In all species the fruit is more or less bitter, and is used extensively as a condiment, though it is cultivated principally for the sake of its oil.

The olive tree grows slowly, but it has great longevity and tenacity of life, and yields a wood prized in cabinet work. There are specimens of olive trees in Turkey and other countries on the Mediterranean whose age has been estimated to be fully 1,300 years, while some in Italy are thought to have existed since the time of Pliny. The olive tree was held sacred to Minerva by the ancients, and many peoples of historical times gave it particular esteem. Wreaths of olives were placed on the brows of victors by the Greeks and Romans, and it is still held as an emblem of peace by many peoples, who use the olive branch as a symbol. The olive tree is propagated by slips, seeds, or grafting. It was introduced into the southeastern part of the United States more than 200 years ago. Plantations of olive trees are especially abundant in Turkey, Spain, France, Italy, Malta, Greece, and the Ionian Islands. Several species are cultivated in Japan and China, where the leaves are used for adulterating tea, and the flowers serve to give a pleasant flavor to that drink.

Olives intended for table use are picked in an unripe condition. A portion of the bitterness is removed by soaking them in water containing potash, and they are afterward bottled in an aromatized brine. Olive oil is a non-drying oil, and is extracted from the fruit by pressure. The olives are gathered and immediately placed in a crushing mill, where they are ground into pulp. Usually the pulp is placed in a press operated by a screw, and the oil oozes from it into a barrel containing water, where it is separated from impurities by the particles settling to the bottom and the oil remaining on the top. The product secured from the first pressure is the best grade of virgin olive oil, but the pulp is pressed a second time and sometimes a third and fourth times. The last product is an inferior quality used for soap making, while the pulp serves for fuel. Olive oil is clarified by filtration through sand and charcoal, when it assumes a beautiful golden color. An oil made from peanuts somewhat resembles olive oil and is often sold on the market as a substitute.

OLIVES, Mount of, or **Mount Olivet**, an eminence situated east of Jerusalem, and separated from it by the Jehoshaphat valley. It was so named from groups of olive trees that formerly grew there, but most of them have been destroyed. The center is somewhat rounded, is 2,640 feet above sea-level, and about 385 feet above the valley. A brook called the Kedron flows through the valley, and near it was the garden Gethsemane. The village of Olivet, or Tur, occupies the central part of the hill, and on the principal summit is a beautiful Armenian church, which is said to mark the spot whence the Ascension occurred, though according to the gospel of Luke that event took place on the farther side of the hill from Jerusalem, near Bethany. Near the church tourists are shown what is thought to be the place where the Saviour wept over Jerusalem, and where He also taught the Lord's Prayer to His disciples. The road leading into Jerusalem around the eastern and southern sides of the Mount of Olives is

said to be the one on which He made His triumphant entry into the city.

OLIVIER (o-le-ve-ā′), **Emile**, statesman and author, born in Marseilles, France, July 2, 1825. He studied law in Paris, where he entered upon a successful practice, and in 1848 was a leading participant in the Revolution. In 1864 he became a member of the legislative assembly, where he supported the liberals, and in 1865 engaged as a judicial officer to the viceroy of Egypt. Napoleon III. invited him to form a ministry in January, 1870, and it was this ministry that declared war against Germany in July, 1870. Soon after the first reverses of the French army he was displaced. His writings are principally political and historical in character, and include two excellent biographies, those of Thiers and Lamartine.

OLMSTED (ŭm′sted), **Frederick Law**, landscape gardener, born in Hartford, Conn., April 26, 1822. He pursued studies relative to agriculture at Yale University, where he also took a course in engineering, and in 1848 began to develop skill as a landscape gardener. In 1850 he traveled on foot in Britain, and visited France, Germany, and Italy in 1855 to study ornamental gardening and parks. Later he had charge of platting the Central Park of New York City. Subsequently he platted the Capitol grounds at Washington, the grounds of the Columbian Exposition at Chicago in 1893, and a number of parks of large cities, including Buffalo, Chicago, and Brooklyn. In 1863-65 he served as a member of the California Yosemite Restoration Committee; and also filled an appointment by President Lincoln as sanitary commissioner in connection with the Civil War. He wrote "Walks and Talks of an American Farmer in London;" "Journey Through Texas;" "Journey in the Slave States," and "Journey in the Black Country."

OLNEY (ŏl′nĭ), **Richard**, statesman, born in Oxford, Mass., Sept. 15, 1835. In 1856 he completed a course at Brown University, studied three years at the Harvard Law School, and, after being admitted to the bar, developed a successful practice in Boston. In 1874 he entered the Massachusetts legislature, but soon after retired from public life to attend his extensive law practice. President Cleveland appointed him attorney-general in 1893, and in 1895 he became secretary of state as successor to Gresham, the duties of which office he administered with much ability.

RICHARD OLNEY.

OLYMPIA (ō-lĭm′pĭ-ą), capital of the state of Washington, situated in Thurston county, at the southern extremity of Puget Sound, about one hundred miles north of Portland, Oregon. It is conveniently connected by railways and has a fine harbor. An abundance of water power is obtained from the Des Chutes River, which has a succession of falls that descend eighty-five feet. A bridge 2,300 feet long spans the southern part of the sound. Among the general facilities are electric lights, telephones, waterworks, and several libraries. The manufactures embrace lumber products, soap, shoes, and earthenware. It is surrounded by a fertile country, which produces cereals, grasses, fruits, and lumber. The city has a number of excellent public buildings, several public schools, and enjoys a growing trade. In 1848 the first settlement in Washington was made at Olympia. Population, 1900, 4,082.

OLYMPIC GAMES, the national festival of the ancient Greeks, celebrated on the plain of Olympia once in four years. They were given in honor of Zeus, and constituted their most splendid national institution. Olympia, the scene of these games, was a locality in the beautiful valley of the ancient district of Elis, in the Peloponnesus, through which flows the Alpheus River. It was adorned by many exquisite works of art, including statues of the gods and celebrated victors, and many excellent monuments, temples, tombs, altars, and treasures of art. There were fully 3,000 statues in the time of the elder Pliny. Among other improvements were the temple of Zeus, known as the Olympium; the temple of Hera, the wife of Zeus; the ten treasuries, in which were stored the dedicatory offerings of the Greek cities; and the Hippodrome and the Stadium, where the contests occurred. The valley was finely improved by highways, groves, and gardens. Recent excavations have thrown much light upon this locality by the discovery of sculptures and the remains of buildings.

The Olympic games date from 776 B. C., and were discontinued in 396 A. D. by Emperor Theodosius. Time was reckoned by the Greeks from the year in which the Olympic games were instituted as a national festival, naming the periods of four years between the celebrations the Olympiads. The contests took place originally only between Greeks, but after the Roman conquest competition became general. Among those victorious at the games were Daicles, Tiberius, Nero, and other distinguished personages. Processions indicating the beginning of the games passed along the Pompic Way, a road that crossed a beautiful spot 660 by 580 feet in extent, which contained the sacred grove and sanctuaries of great beauty and value. Hostilities between contending parties ceased while the games were in progress, and every Greek who had

left his native country made it a point to return on these occasions, if possible, in order to contend in the various athletic sports. These sports consisted of running, wrestling, and other exercises calling into account the various muscles of the body, the favorite games being chariot and horse racing, throwing the quoits and spears, and leaping.

It was necessary for all who took part in these games to have at least ten months' training in the Elis Gymnasium, and judges were selected to determine who should receive the prizes. Those receiving the highest stations of honor were adorned with wreaths of palm leaves, and in later years with garlands taken from the olive trees in the sacred grove. Many of the distinguished victors had statues erected to their memory, and they were otherwise honored by favorable mention and by exemption from taxation. During the festivals many sacrifices and services of devotion were offered to the gods, and there was a profusion of inspiring instrumental and vocal music. A movement originated in modern Greece in 1896 to revive the Olympic games, that year being exactly 1,500 years after they were abolished by Emperor Theodosius. At that time a fine stadium was erected, and the performances were witnessed by distinguished people from all countries. The sports consisted of aquatic and athletic performances, and, as a result, modern Greeks have acquired a new impetus for the development of athletic skill, exercises calculated to benefit them physically as a nation.

OLYMPUS (ō-lĭm'pŭs), **Mount**, a range of mountains situated in Turkey, on the boundary line between Macedonia and Thessaly, though it is generally known by modern Greeks as Olymbos. The highest peak rises 9,740 feet above sea-level. In the region are many deep ravines and precipices in which forest trees are abundant. This group of mountains entered largely into the mythology of the ancient Greeks, since they believed that Zeus occupied a palace on the top of Mount Olympus. They regarded its peak wrapped so densely in clouds and mist that it was hidden from mortal view. Their poetry relates that its atmosphere is bright and refreshing, that youth never ages there, that on its summit is the palace of Zeus and Hera—a structure of burnished gold, cast silver, and gleaming ivory. The later legends, originating at a time when the knowledge of the universe and divine powers became enlarged, convey the view that the gods have their existence in the heavens, among the planets, and it was thus that the name of Olympus became attached to the firmament.

OMAHA (ō'ma-ha), the metropolis of Nebraska, situated in Douglas county, on the Missouri River, opposite Council Bluffs, Iowa. It occupies a beautiful site along the river, has extensive railroad connections, and is connected with Council Bluffs by a system of electric railways. Two fine bridges cross the river, one being a railway bridge and the other serving to accommodate pedestrians, vehicles, and the street railways. The former is 2,750 feet long and is used largely by all the lines running east. Many of the streets are paved with stone, brick, or asphalt. The city has all the modern municipal improvements, and contains many excellent educational institutions, among them a number of fine high schools, two medical colleges, and a public library of 50,000 volumes. It is the seat of Creighton College, Brownell Hall, the Academy of the Sacred Heart, St. Catherine's Academy, and the state institution for the deaf and dumb. All the leading religious denominations have fine church edifices in the city. Many excellent daily and weekly newspapers are published, and a number of educational and scientific societies are maintained. The manufactures embrace spirituous liquors, linseed oil, packed meats, hardware, machinery, brick and tile, white lead, soap, safes, and boilers. It is the seat of extensive smelting works, and contains the headquarters of the military department of the Platte. There are many fine streets and business buildings, some of them ranking among the best in the central west. In 1898 Omaha was the seat of the Trans-Mississippi Exposition. It ranks as the thirty-fifth city in the United States. Population, 1900, 102,555.

OMAHAS, an Indian tribe of the Dakota family, which was first met in 1673 by Father Marquette. The Omahas formerly occupied the region now included in eastern Nebraska and western Iowa, and in 1820 ceded lands at Council Bluffs. Several wars occurred between them and the Sioux Indians, but in 1854 a general peace was declared. Their reservation is situated in the northeastern part of Nebraska, where they have made material advancement in the arts of peace, especially in agriculture. They patronize schools and churches, and engage extensively in the culture of cereals, live-stock, and vegetables.

OMAR I. (ō'mer), second caliph of the Moslems after Mohammed, born in 582; died in 644. He became a convert to Mohammedanism in 615, succeeded Abu-Bekr in 634, and during his caliphate remarkable increase was made in the numerical strength of the Moslems. The armies sent forth by him conquered Syria in 636, Jerusalem in 637, and Egypt in 640. Later he subdued Persia and carried his dominion far south of the Mediterranean Sea. A mortal wound inflicted upon him by a Persian slave at Medina in 644 ended his victorious career. The calculation of time from the Hegira was instituted by him. A Mohammedan historian says the following of him: "He took from the infidels 36,000 cities or castles, destroyed 4,000 temples or churches, and

founded or endowed 1,400 mosques." Othman succeeded him as caliph.

OMAR KHAYYAM (khi-yäm), astronomer, poet and mathematician, born in Nishapur, Persia, about the middle of the 11th century; died there in 1123 A. D. He studied under one of the eminent Persian teachers, and soon after engaged extensively in the study of astronomy and mathematics. A government pension enabled him to devote his time to research, and during that period he effected a reconstruction of the calendar. He is the author of a treatise on astronomy and several treatises on mathematics, and published a number of excellent poems and epigrams. Several of his writings have been translated into European languages, among them a work on algebra into French and a poetical work known as "Rubaiyat" into English and German. His writings indicate that he was a free thinker, though as a matter of policy he made a pilgrimage to Mecca.

OMAR PASHA (pä-shä'), Turkish general, born in Plaski, Austria, in 1806; died in Constantinople, April 18, 1871. He was the son of an Austrian officer stationed in the province of Croatia, and his proper name was Mikail Lattas, but on account of committing a slight offense he fled to Turkey, where he changed his name to Omar and embraced the Moslem faith. His natural ability and education brought him in contact with high officials of the government, and he soon became tutor to the heir apparent to the Turkish throne, Abdul Medjid. After the latter became sultan, Omar Pasha was appointed governor of Lebanon, and in 1843 became commander of the army in Bosnia and Albania. In 1853-56 he commanded the Turkish forces against the Russians, and in that period defeated them at Kalafat and Eupatoria. Later he was made governor of Bagdad, put down a rebellion of Montenegrins in 1862, and served as minister of war at Bagdad until 1869. Subsequently he held the honorary position of advisory minister until his death.

ONEGA (ō-nē'ga), a river of northern Russia. It rises in Lake Latcha, in the government of Olonetz, and after a course of 275 miles toward the north flows into Onega Bay, an inlet from the White Sea. Archangel is the principal city on its banks.

ONEGA, a large lake of northern Russia, in the government of Olonetz, located northeast of Lake Ladoga, next to which it is the largest lake in Europe. It is 146 miles long, fifty-two miles wide, and has an area of 3,760 square miles. Several rivers flow into it, and its outlet is the Sveer, a river flowing into Lake Ladoga. It has a depth of about 600 feet, is rich in fish, and contains a number of islands. Lake Onega is connected by canal with the Volga system of Caspian Sea navigation, and with the White Sea by the Dwina Canal system.

ONEIDA (ō-nī'da), a town of Madison county, New York, situated twenty-four miles east of Syracuse. It has a number of railroads and is surrounded by an agricultural and hop-growing country. Among the manufactures are flour, steam engines, cotton and woolen goods, and machinery. It has a library, waterworks, and several fine school and church buildings. Population, 1900, 6,364.

ONEIDA, a lake in northeastern New York, in Oneida, Oswego, Onondaga, and Madison counties, about twenty miles southeast of Lake Ontario. Its length is twenty-two miles, width five miles, and its outlet is the Oneida River. This stream is about eighteen miles long and flows into the Oswego River, whose water is discharged into Lake Ontario. The lake and tributary streams abound in fish.

ONEONTA (ō-nē-ŏn'ta), a city of New York, in Otsego county, on the Susquehanna River, sixty miles northeast of Binghamton. It is conveniently situated on a number of railroads, and is surrounded by a farming and stock-raising country. Among the manufactures are shirts, pianos, cotton and woolen goods, machinery, and cigars. It has excellent municipal facilities, including pavements, waterworks, and electric lights. The city has a number of fine school buildings and several churches. It is the seat of a state normal school. Population, 1900, 7,147.

ONION, an edible bulb, produced by a biennial herb of the lily family. The plant has tubulated leaves, a pithy stalk bearing

SPECIES OF ONIONS.

the seed, and the bulb has a strong odor and taste due to an acrid volatile oil that is destroyed by boiling. Onions are native to Central Asia, but they have been cultivated from the tropics to regions far into high latitudes for centuries. They attain the largest size in warm countries. There are about twenty species, those best known among the cultivated varieties including the Strasburg, Egyptian, Spanish, Danvers, Portuguese, and Pearl. Onions have a stimulating influ-

ence on the secreting organs, and are used in medicine. Garlic belongs to the same family, but has a stronger odor and taste, and its bulb is composed of from eight to twelve smaller ones, called cloves. Onions can be grown successively on the same ground, but they require much manuring. Some species bear bulbs at the top, but the species generally grown for the markets yield large rooted bulbs.

ONTARIO (ŏn-tā′rĭ-ō), **Lake**, the smallest and most easterly of the Great Lakes of North America, which forms a connection between the Niagara and St. Lawrence rivers. Its altitude above sea-level is 247 feet, and the greatest depth 600 feet. The lake has a length of 190 miles, a breadth of fifty-four miles, and covers an area of 7,240 square miles. It has a number of important coast indentations and many islands, most of them being in the northeastern part. It is open for navigation practically the entire year, thus serving as a convenient and important commercial route, though at some seasons of the year storms of more or less violence prevail. The principal canal connections are with the Atlantic Ocean by the Hudson River and the Oswego and Erie canals, with Lake Erie by the Welland Canal, and with Ottawa by the Rideau Canal. Oswego is the most important lake port on its New York shore, and its chief ports of Canada include Kingston, Hamilton, Coburg, and Toronto. Besides receiving the inflow of the Niagara River, it is fed by the Oswego, Genesee, and Black rivers. It has fine fisheries.

ONTARIO, a province of Canada, the most populous subdivision of the Dominion. It is situated immediately north of the St. Lawrence River and the Great Lakes. East of it is the province of Quebec, north James Bay and Keewatin, and west the province of Manitoba. It embraces a total area of 222,000 square miles. The surface is generally rolling, and the drainage is principally into the Great Lakes and the St. Lawrence River, while a portion of the northern part drains into James Bay. Among the principal rivers within the province are the English, Moose, and Abittiti. The larger rivers forming part of its boundary include the Albany, Rainy Lake, Ottawa, Niagara, and St. Lawrence. Lakes Superior, Huron, Erie, and Ontario form a part of the boundary between it and the United States, and these belong in part to the Dominion, as also does a part of the Falls of Niagara. In the province are hundreds of smaller lakes, most of which are situated in the western portion, including principally Lake of the Woods, and St. Joseph, Savan, Sturgeon, Nipigon, Long, and Missinale lakes. There are no mountains of importance, the Laurentian Hills being the most noteworthy, which stretch westward from the Thousand Isles, forming the northern shores of Lake Huron and Georgian Bay.

The province has vast and valuable forests, a large area of fertile soil, and the climate, though hot in summer and cold in winter, is remarkably healthful. It possesses much mineral wealth, the important deposits including iron, gold, silver, nickel, copper, salt, gypsum, marble, sandstone, and petroleum. Large quantities of minerals are produced annually, especially iron, gold, nickel, and copper. The fisheries yield an excellent quality of whitefish, trout, herring, and other marketable varieties. Among the agricultural products are wheat, oats, barley, turnips, potatoes, mangel wurzels, corn, hay, tobacco, and vegetables. It has large interests in the rearing of live-stock, including all domestic animals usually raised in temperate climates, such as horses, cattle, swine, and sheep. Dairying, farming and fruit-growing are important industries. The manufacturers secure their supply of coal largely from Nova Scotia and from the United States. Among the principal productions are cotton and woolen goods, lumber products, furniture, carriages and wagons, engines and boilers, tobacco and cigars, leather, boots and shoes, soap, chemicals, paper, hardware, and machinery. The export and import trade is facilitated by lake, river, and canal navigation and a considerable railway mileage, the latter representing a total of 7,025 miles.

The region now included in Ontario belonged to Quebec until 1791, when it was separated from that province and called Upper Canada. Previous to that time it had been inhabited by roaming tribes of Indians and many varieties of wild animals, and was for some time an important fur-producing district. The first permanent settlements were founded after the Revolutionary War by loyalists who left the United States, and in 1792 the capital was situated at Niagara, but afterward it was removed to Toronto. United States forces invaded the province in the War of 1812, and in 1837 a rebellion of local parties took place. It was organized as a separate province in 1867, since which time it has gained rapidly in wealth and population, though the most populous parts still remain largely in the regions lying adjacent to Lakes Huron, Erie, and Ontario.

An excellent public school system is maintained under government taxation. The educational facilities include kindergartens, common schools, night schools, high schools, and teachers' institutes. It has a number of fine institutions of higher learning under government supervision, including two normal schools and the Toronto University and College. Among the principal private institutions are Queen's College, Kingston; McMaster College, Toronto; Victoria College, Toronto, and St. Michael College, Toronto. All the leading religious denominations are well represented, and there are 525 periodicals, which include fifty-seven dailies and 385 weeklies. Toronto is

the capital, where the government is administered by a lieutenant-governor, who is assisted by an executive council and a legislative assembly. The principal cities include Toronto, Ottawa, Hamilton, London, Kingston, Brantford, Windsor, Guelph, Stratford, Chatham, and Galt. The population of the province is 2,182,947, of which 21,325 are Indians.

ONYX (ō'nĭks), a variety of quartz consisting of layers that have different colors which are strongly contrasted, chiefly white, white with black, brown, or red. The layers are usually in even planes, and therefore it is specially adapted for cameos, for which purpose it was used by the ancients. The name is applied to chalcedony, jasper, and other crystalline minerals when strongly marked in colors of several shades. A species marked with white stripes alternated by red bands of carnelian is known as sardonyx, which is highly valued on account of its rarity. Onyx marble is a beautiful clear white stalagmitic carbonate of lime. It is of value in the manufacture of ornaments, and is produced chiefly in Algeria.

OORI LIMPOPO, or **Crocodile,** a river of southern Africa. It rises in the Transvaal, near Pretoria, thence flows northwest to the Transvaal boundary, whence it makes a semi-circle until it enters the Indian Ocean at a point immediately north of Delagoa Bay. Its entire course is 800 miles, but its navigation does not extend farther than fifty miles from its mouth, being obstructed at that point by rapids and falls. It has a number of tributaries, the most important being the Olifant River.

OPAL, a precious stone consisting mainly of silica with about ten per cent. of water. It is very brittle, and is distinguished by its reflection of light of many colors. Opals do not occur as crystals, and their value depends upon the display of delicate colors, the finest grades constituting valuable gems when cut. They are usually prepared with a convex surface, since they display the colors to best advantage in that form. Opals of a fine quality are produced in Hungary, the East Indies, South America, Saxony, and many other regions, and occur generally in sandstone having the nature of iron. The varieties are very numerous, the principal ones being common opal, a grade having yellow, white, green, brown, or red colors, but not displaying them; semi-opal, a variety nearly opaque; fire opal, a grade giving only red reflections; menilite, a variety slightly translucent or opaque but formed in irregular masses; hydrophane, a class transparent only when placed in water; and precious or noble opal, the grade reflecting brilliant and changeable colors of red, blue, green, and yellow. Precious or noble opal is the most valuable. A noted specimen of it is owned by the imperial family of Austria. This particular gem has a length of five inches, a width of about three inches, and a thickness of about one inch. The ancients attributed magical properties to opals, and in the time of Roman prosperity they were held in high esteem. It is said that Mark Antony was desirous of possessing an opal belonging to the Roman senator Nonius, but the latter preferred exile to parting with it, and Pliny ascribes to this particular gem a value of $500,000.

OPERA (ŏp'ĕr-à), the musical form of drama, which is composed of quartets, trios, duets, solos, recitatives, choruses, and finales, or a variety of them. Instrumental music accompanies an operatic entertainment throughout, and is variously combined to produce certain desired effects. The whole is preceded by an instrumental overture or introduction, as is usually every act or division. Costumes and scenery are employed to heighten the dramatic effect, though these are not absolutely essential. The three recognized schools of opera are Italian, German, and French, but they have been modified more or less to suit the taste of various countries. The Italian opera was developed largely from the miracle plays of the Middle Ages, and dates from the 16th century, when the classical story of Daphne was reduced to a drama by Rinuccini, and which Peri soon after set to music. However, the real founder was Scarlatti (1659-1725), who wrote a number of productions that created a widespread interest. Rossini is regarded the most purely Italian operatic composer, and "Barber of Seville" and "William Tell" are his best productions. Other famous composers of this school include Piccini, Cimarosa, Jomelli, Bellini, Verdi, and Donizetti.

The German opera developed principally from the Italian, but in later times assumed an independent form and is now the highest in point of perfection. Dresden and Vienna were the first centers in which Italian operatic plays were transplanted, but at Hamburg a profound interest was developed by Keyser (1694-1734), who wrote about one hundred operas. Mozart is among the eminent German operatic masters, giving Germany the first national opera, entitled "Magic Flute." Beethoven is famous for his "Fidelio," and Von Weber in his "Der Freischutz" gathered with masterful effect the national folk lore. Others of the school include Handel, Gluck, Flotow, Meyerbeer, and Wagner. The melodrama, a musical drama interspersed with spoken dialogue, is also of German origin.

The opera was taken to France by Cardinal Mazarin in 1646. In the French school recitatives are prominent features, while special stress is laid on theatrical exactness. Among the principal composers of France are Monsigny, Rousseau, Auber, Herold, Gounod, Herve, Bizet, Offenbach, and Lecoq. Much of the writings of Meyerbeer and Handel was also incorporated with the French. The opera in England was devel-

oped chiefly from the German and Italian by Purcell. Handel aided in making it popular by adapting a number of compositions from the German. The English operatic composers include Wallace, Balfe, Mackenzie, Macfarren, and Sullivan. Operatics became popular in America about 1825, and since then many noted productions have appeared. Among the leading American composers are Damrosch, Reginald De Koven, Sousa, and Fry. Several varieties of opera are now recognized, the principal classes being the comic opera, or opera bouffe; romantic opera, or opera drammatica, a variety including both sentimental and solemn scenes; and grand opera, or opera seria, the class consisting largely of recitatives varied with singing and music.

OPERA GLASS, a double telescope of small size for magnifying a large field of view, and used chiefly by spectators in attending theater or opera, hence its name. The opera glass permits the use of both eyes. Most opera glasses have a magnifying power of two or three times. They have a plano-concave or double-concave eye-glass, so that the image is not inverted and little light is lost, thus securing much distinctness. The principal manufacturers of opera glasses are in Europe, the largest establishments being located in Paris. Field glasses are the finest class of opera glasses, and possess both achromatic eyelenses and object-lenses.

OPHIR (ō'fir), a name applied in the Bible to a region forming the source from which Solomon secured precious stones, gold, sandal-wood, and other valuables, but its exact location has continued to be a matter of conjecture. The Bible specifies that Solomon's vessels were fitted up in the harbors of Edom, and that three years were required to make the voyage. Some writers think that the name Ophir applied to regions of eastern Africa, others have expressed the view that India was meant, and Josephus ascribes to Malacca that distinction. Within the last few years it has been asserted by a number of travelers that the Ophir of Solomon included the regions of South Africa now embraced in the Transvaal. This view is expressed because gold and silver mines have been found in that part of Africa which appear to have been worked extensively in ancient times.

OPIE (ō'pe), **John**, portrait and historical painter, born in Cornwall, England, in May, 1761; died April 9, 1807. His taste for drawing and historical study was developed early, and at the age of twelve he opened an elementary evening school. In 1780 Doctor Wolcott, commonly known as Peter Pindar, gave him substantial aid to develop his ability by study and practice in London. His paintings of greatest note include "Presentation in the Temple;" "Slaughter of Rizzio;" "Juliet in the Garden," and "Jephtha's Vow." He lectured on art, wrote "The Life of Reynolds," and illustrated Macklin's "Poets and Biblical Gallery" and Bowyer's "English History." His wife, Amelia Opie (1769-1853), attained a reputation as a novelist. The best known of her writings include "Tales of the Heart;" "Father and Daughter;" "Valentine's Eve;" "Detraction Displayed," and "Lays of the Dead."

OPIUM (ō'pĭ-ŭm), the milky juice obtained from the unripe capsules of several species of the poppy, which is rendered concrete and dark colored by exposure to the air. The poppy is cultivated in many places as a garden plant for its beautiful single or double flowers of white, violet, red, or variegated colors, but in Turkey, India, China, Hindustan, and other countries it is grown extensively in plantations for its yield of opium. Poppies require a rich soil to mature to their best form, and in many localities irrigation is utilized to supply an abundance of moisture. The time of sowing varies somewhat in different regions, owing to a difference in latitude, but the plants mature sufficiently in about three months to supply conditions favorable for collecting the milky juice from the heads or capsules, then about the size of a hen's egg. At that time incisions are made in the unripe capsules with a small instrument having several little blades, and after allowing the juice to exude and dry over night, it is collected in an earthen vessel by scraping it from the capsule with a blunt knife. It is next dried uniformly, being turned at frequent intervals for that purpose, and when the moisture has sufficiently evaporated, it is taken to the factory and made into small tablets or balls and boxed for the market.

OPIUM POPPY.

Chemically opium is a mixture of alkaloids, the chief of which are morphine, narcotine, and codeine, with various organic acids. These are valuable in medicine for their narcotic and sedative properties, as is also the drug itself. Morphine is a derivative of opium, and laudanum is a simple tincture in spirits of wine. Opium has a faint smell, is bitter and acrid to the taste, and can be easily indented with the finger. Though serving as a useful medicine in producing sleep and allaying pain, it forms a very dangerous and harmful drug to those who acquire the habit of using it continuously. Shortly after taking opium there is a stage of increased mental activity, but this

is followed by a relapse, nervousness, and depression, which the user seeks to overcome by taking another dose. The habitual opium-taker becomes spare of body, his skin grows sallow, his appetite diminishes, and the functions of the vital organs are interfered with to a considerable extent.

It is estimated that there are about 1,000,000 persons who smoke opium in the United States. Those smoking opium have a peculiarly constructed pipe in which they place a small quantity, about the size of a pea, the smoke of which is inhaled until the desired intoxication is effected. As the habit grows, larger quantities are required. Some users take two or more of the opium balls. Opium smoking is very prevalent in China, India, and other countries of eastern Asia, where special pipes are made for the purpose, and opium smoking rooms are maintained. India is the main source from which the Chinese secure their supply of opium, and under the British it has been a government monopoly there since 1793. China prohibited the importation of opium in 1796, and until 1839 made strenuous efforts to enforce the law, but the desire of Great Britain to promote commerce by maintaining its market in China for Indian opium products caused it to declare a war, and thus forced China to admit the poison. The British government derives an annual income of fully $50,000,000 from the opium traffic, though it is opposed by every educational and religious association of influence, since it not only wrecks the physical constitution of millions annually, but impairs their moral functions.

OPORTO (ō-pōr'tō), an important city and seaport of Portugal, next in size to Lisbon, on the Douro River, and capital of the province of Minho. It is nicely located in an undulating region along the river, has a fine harbor, good railroad connections, and contains electric lighting, street railways, and other municipal facilities. There are several fine bridges across the Douro River and numerous excellent business blocks. It is the seat of the Gothic St. Francisco church, founded in 959, a Gothic cathedral, and a bishop's palace. Among its institutions are several academies of art, medicine, and science, and a number of monuments, among them a granite tower 210 feet high. It has a number of excellent public parks, landscape gardens, boulevards, and churches, and a fine public school system. The manufactures embrace wines and liquors, cotton and woolen goods, boots and shoes, sugar, cork, tobacco products, ribbons, soap, hats, porcelain, machinery, and sailing vessels. There is a large export trade in oranges, port wine, and cereals. Oporto had a reputation as a commercial city in the time of the Moors, when it was largely in the hands of Christians. It obtained historic importance by its strong fortifications that withstood many attacks during the Middle Ages, but it was taken by the French in 1808, and was held successfully by Dom Pedro, the ex-emperor of Brazil, against the forces of Don Miguel in 1832. The capital of Portugal was for some time at Oporto. Population, 141,060.

OPOSSUM (ō-pŏs'sŭm), a class of marsupial mammals native to America. They include a large number of species, ranging in

OPOSSUM.

size from that of a house-mouse to that of a large cat. The hair is soft and wool-like, and the color generally whitish-gray with several stripes down the back. They live largely on trees, where they pursue insects, birds, and other forms of animal life for food, though some species partake of fruits and tender vegetable forms, while still others feed on crabs and crustaceans. From eight to fifteen young are produced by the female, who nourishes them in the pouch for some time, where they also seek safety in case of alarm. Some varieties do not have pouches, but instead carry their young on the back, the tail of the young being entwined around that of the mother. Most of the species are clumsy and awkward in moving from place to place while on the ground, but they have great activity and skill in moving about among the branches of trees, being especially fitted for this by their hand-like feet, which are adapted for grasping, and by reason of their prehensile tail. The common or Virginia opossum ranges from the central United States to Brazil. It is whitish-gray in color, has black ears and feet, and is esteemed as food. The murine opossum is about the size of a house mouse, and is found from central Mexico to Brazil. The term "playing 'possum" originated from the habit of the opossum of counterfeiting death when in danger, and is used to express proceedings indicating deceit.

OPTICS (ŏp'tĭks), the branch of science that treats of the properties of light and vision as pertaining to the human eye. See Light.

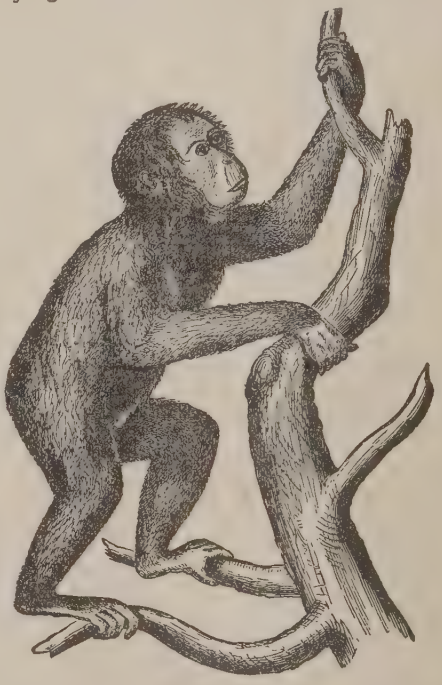
OPTIMISM (ŏp'tĭ-mĭz'm), the doctrine that everything in nature and the history of

mankind is ordered for the best, and that the order of things in the universe is adapted to produce the highest good. This doctrine is of ancient origin and is represented by philosophers both of ancient and modern times. Leibnitz is the leading modern advocate of it. Its tenets are fully exemplified in his work entitled "Theodicæ."

ORACLE (ŏr'ȧ-k'l), a term applied in classical antiquity to the seat of worship of some special divinity, where prophecies were given in answer to inquiries relating to some event or to some proposed course of action. Priests or priestesses usually announced the revelations, but in some cases they were given out by signs. The desire to avert threatened danger or secure success by penetrating into futurity has animated mankind in all ages of the world. Anciently people flocked from far and near to consult the oracles situated at different places, the advice and approval of these mouth-pieces of the gods being deemed essential in all great undertakings, such as proposed conclusions of peace, declarations of war, the enactment of laws, and various personal matters. The most famous Grecian oracle was that of Apollo at Delphi, where a priestess called Pythia, named after the serpent Python slain by Apollo, delivered the oracles. To prepare for the important task Pythia first bathed in the waters of the Castalian spring, and was then conducted into the temple by the priests, where she was surrounded by clouds of incense and uttered peculiar phrases, which the priests interpreted to the people as coming directly from the god Apollo. There were twenty-two oracles for the consultation of Apollo. Among the important oracles were those of Miletus and Argos; that of Zeus at Dodona, and that of Jupiter Ammon in the Libyan Desert. The people continued to consult the oracles until the time of Theodosius, who caused the prophetic deities to be destroyed and their temple closed.

ORAN (ō-răn'), a seaport city of Algeria, capital of the Oran province. It is situated on the Gulf of Oran, an inlet of the Mediterranean Sea. The city is defended by several forts, has a beautiful location on the hills that form an amphitheater above the gulf, and its harbor is amply protected by moles. Though a North African city, it is largely European in appearance. It has good railroad facilities, electric lights, and other municipal improvements. The city has a well organized school system, several colleges, a military hospital, a seminary, a Roman Catholic cathedral, and a number of mosques, churches, and synagogues. There is a large export and import trade. Among the manufactures are tobacco products, utensils, wine and other spirituous liquors, clothing, toys, and earthenware. The Moors founded the city in the 15th century, and it passed successively to the Spaniards, Turks, and French, the last named securing permanent possession of it in 1831. Fully three-fourths of its population are Europeans, the total being 76,210.

ORANG, or Orang-Outang (ō-rang'-ōō-tăng'), the name of an anthropoid ape, signifying "man of the woods," and native to



ORANG OUTANG.

Sumatra, Borneo, and Malacca. There is but one species of this class of apes. Like the chimpanzee and gorilla, it approaches in many respects the physical structure of man, though it is inferior to both these classes. Its brain and spine are quite manlike. It is unable to walk with ease in an erect posture, and attains a height of from four to five feet. The hairs have a reddish-brown color, peculiarly resembling those of the people native to the countries where it is found, and the arms reach to the ankles when standing erect. The short hinder limbs make it impossible to move with facility while on the ground, but when among the branches of trees the orangs pass rapidly from limb to limb, or swing themselves from one tree to another. They build nests in trees, where they live the greater portion of the time, and where they also sleep. Their intelligence and strength are alike remarkable. A number of orangs captured young have been not only domesticated, but taught many skillful tricks. It is remarkable that the orang does not live long in captivity, and with age the temper becomes quite disagreeable.

ORANGE (ŏr'ĕnj), a city of New Jersey, in Essex county, twelve miles west of New

York City. It is connected by several railroads and electric car lines, and has substantial pavements, numerous public parks, waterworks, and a fine public school system. Among its notable buildings is the Masonic Temple, Memorial Hospital, a number of fine churches, and several structures devoted to educational and scientific purposes. Among the manufactures are carriages, hats, clothing, shoes, machinery, and earthenware. West of the city is Llewellyn Park, a tract of fifty acres, and Orange Mountain, an eminence 650 feet above sea-level. Population, 1900, 24,144.

ORANGE, a class of fruit trees of the citrus genus, including several species. They are native to China, India, and other countries of eastern Asia. The orange tree was cultivated for its fruit from remote antiquity, but it was not introduced into Europe until brought there by the Moors in the 14th century, and was first cultivated in Portugal about 1520. Since then it has been

ORANGE.

naturalized in all the warmer climates. Many species have been improved by careful propagation. The United States produces large quantities of oranges, the most productive plantations being in California, Florida, and Louisiana. Other countries taking high rank in the production of oranges include Mexico, the West Indies, the East Indies, China, India, Australia, and North Africa. The orange tree is an evergreen. It has oblong, thick, and smooth leaves, bears fragrant white flowers, and grows to a medium height. The fruit has a bright yellow color, is globose in form, and has a thick rind and a pulp containing luscious juices. Some varieties have seeds while others are seedless. The trees bear in about six years and often live 600 years. Large specimens produce from 2,000 to 12,000 oranges in a year.

The wood of the orange tree is fine-grained and smooth, and of service in fine cabinet work. There are many varieties of oranges sold in the market; some are sweet and others bitter. The sweet varieties are most desired for eating, while the bitter yield flavoring and medicines. Among the common varieties are the China orange, Lisbon orange, Maltese or red pulped, Mandarin or clove, St. Michael, Majorca seedless, Tangerine, and the oval-shaped egg orange. The fruit intended for distant markets is picked before fully ripened and wrapped in paper. It is shipped in boxes containing about 250 oranges. Fragrant oils are secured from the rind, leaves, and flowers. These oils are of use for flavoring and in perfumery. Orange blossoms are used extensively at weddings to decorate the bride. A drink called curacoa is prepared from the oranges that are shaken from the tree by winds or otherwise before ripening.

ORANGE, a river of South Africa, rises in the Kathlamda Mountains of Natal, and after a course of about 1,000 miles toward the west flows into the Atlantic Ocean. It drains a basin equal to 325,000 square miles. The volume of its water is reduced considerably during the dry season, but during the rainy season the river is navigable for a considerable distance, though there is a large bar obstructing its mouth. The Vaal is its principal tributary.

ORANGE, a British colony of South Africa, situated between Cape Colony and the Vaal River. It has an area of 48,326 square miles. The surface consists largely of a plain elevated from 3,000 to 5,000 feet above sea-level, and the soil is generally productive. The winters are cold and the summers hot, with occasional droughts. Agriculture and stock-raising are the principal industries, though within recent years there has been a remarkable development of its mineral resources. Among the principal cereal crops are Kaffir corn, wheat, oats, barley, and rye. There are also extensive productions of vegetables and fruits. A fine grade of merino sheep is reared, also horses, cattle, milk cows, goats, ostriches, and poultry. The mineral wealth embraces diamonds, silver, gold, coal, and garnets. Railroad lines are operated to the principal sections of the country, and there are an abundance of timber and a climate congenial to Europeans.

The region was formerly populated by African tribes, but Boers from Cape Colony made extensive settlements there in 1835-36 for the purpose of founding a republic, being dissatisfied with the taxation and other institutions placed upon their former country by the British. In 1848 Great Britain forcibly annexed the region then known as the Orange River Free State, but in 1854 it again secured its independence. The discovery of gold in 1887 caused a rapid settlement and development in many parts, which ultimately led the British to desire it as their possession. In 1899 a war broke out between the British and the Transvaal Republic. In this the Orange River Free State became involved by reason of a defensive alliance between the two republics, and after a prolonged war the British forcibly dispossessed the occupants and annexed their country, in 1900. The language spoken is the Dutch, or Hollandish. Excellent systems of schools and higher

educational institutions were established by the Boer occupants, cities were founded, and the material resources developed. Bloemfontein is the capital. Other cities include Harrismith and Jagers Fontein. The total population of the colony is 210,640, which includes 130,075 natives.

ORATORIO (ŏr-ȧ-tō′rĭ-ō), a composition taken directly from Scripture or paraphrased upon some theme in sacred history. It is generally arranged to include quartettes, trios, duets, solos, recitatives, choruses, and other forms of music, and usually is semi-dramatic. The oratorio is so named from the oratory of a church near Rome named Santa Maria Maggiore, where it was desired to make religious services attractive by presenting scenes from Scripture in the form of musical performances. The date of these performances is ascribed to the period intervening between 1571 and 1594, though St. Filippo de Neri is credited with having founded a congregation of oratory in Rome as early as 1540. The general interest attracted by this class of musical presentations of sacred subjects induced many eminent poets and composers to devote their attention to the production of oratorios. St. Filippo de Neri induced composers to set to music many parts of Scriptural history, among them the incidents connected with the Prodigal Son, Job and his friends, and the Angel Gabriel with the Virgin. Metastasio and Zeno prepared a number of oratorios, and Sebastian Bach, in 1729, wrote his celebrated "St. Matthew." Other notable productions include Handel's "Messiah" and "Israel in Egypt;" Beethoven's "Mount of Olives;" Mendelssohn's "Saint Paul" and "Elijah;" Haydn's "Creation," and the celebrated "Passion of Christ," still popular above all others. Among the more recent oratorios may be named Liszt's "St. Elizabeth;" Paine's "St. Peter;" Sullivan's "Light of the World;" Schumann's "Paradise and the Peri;" Cowen's "Deluge" and "Ruth," and Mackenzie's "Rose of Sharon." Leopold Damrosch established the Oratorio Society of New York, the first American institution of that character, in 1873.

ORCAGNA (or-kän′yä), **Andrea di Cione**, poet and artist, born in Florence, Italy, in 1308; died about 1386. He was the son of a Florentine goldsmith, Maestro Cione, and his name was coined from Arcagnuolo, meaning archangel. He was early trained for important artistic work, a training that can be traced in the delicate finish of all his sculptures. In 1335 he became architect of the Church of San Michael in Florence, where he produced his masterpiece, a splendid marble tabernacle. His paintings include the work done on the San Maria Morella church at Florence, where he frescoed, among other noted productions, "Christ and the Virgin" and the "Last Judgment." Besides his works in painting and sculpture, he also attained to eminence by productions in architecture and poetry. Such masters of art as Angelo and Raphael studied his work with care, and Boccaccio extended his memory in his "Decamerone."

ORCHARDSON (ôr′chĕrd-sŏn), **William Quiller**, portrait painter, born in Edinburgh, Scotland, in 1835. He studied in his native city, where he also painted portraits and scenes from real life, and in 1863 removed to London. In 1868 he became associated with the Royal Academy, and in 1879 was made an academician. His works rank among the most excellently finished and finely colored of recent painters. The more noteworthy productions include "Napoleon on Board the Bellerophon;" "First Cloud;" "Bill of Sale;" "Queen of the Swords;" "Her Mother's Voice;" "Christopher Sly;" "Young Duke," and "Salon of Madame Recamier."

ORCHIDS (ôr′kĭds), a class of herbaceous plants or shrubs, including about 2,000 species, and generally distributed throughout the torrid and temperate zones. In very dry and cold climates there are only a limited number of species, where they grow in the ground as herbs or shrubs, but in warm and moist regions they are connected with rocks and trees, and their roots do not draw moisture from the soil. Under such conditions they subsist on nourishment derived from the air. Orchids are especially abundant in the moist regions of the East Indies and the vast forests of the Amazon valley of South America, but attain also to numerous varieties and considerable size in the West Indies, Mexico, and Central America. Many species have been acclimated, and are cultivated in gardens for the beauty and peculiar shape of their flowers. The flowers are fragrant, have bright colors, and are especially peculiar because of the various forms taken on by one of the six petals, which is known as its lip. In many of the American and European countries the culture of orchids has developed into an important industry, and the form and size of the flowers produced by many propagated varieties cause them to demand high prices. The roots and tubers of some species yield a nutritive substance known as salep, and several others yield vanilla.

ORCHIDS.

ORD, Edward Otho Cresap, soldier, born in Cumberland, Maryland, Oct. 18, 1818; died in Havana, Cuba, July 22, 1883. In 1839 he graduated at the United States Military Academy, and afterward served

against the Seminole Indians in Florida. He was made brigadier-general of volunteers at the beginning of the Civil War, and later secured command of a brigade of Pennsylvania reserves. On May 2, 1862, he was promoted major-general of volunteers, led the left wing of Grant's army at Iuka and Hatchie, and commanded at the siege and capture of Vicksburg and Jackson. He rendered valuable assistance at the evacuation of Richmond in 1865, and was present at the surrender of General Lee. In 1866 he was mustered out of the volunteer service, and was given an appointment as brigadier-general in the regular army. Subsequently he had command of various military departments, and in 1881 retired with the rank of major-general.

ORE, a natural substance found in the earth, which yields metals by applying various processes, principally roasting and smelting. The term is applied usually to a mineral from which the metal can be extracted profitably, but is sometimes extended to non-metallic minerals, as sulphur ore. Metals occurring in a pure state free from other substances are called native. Ore consists of metals in combination with one or more of the non-metallic elements, the principal combinations being metals with sulphur, forming sulphide; with chlorine, forming chlorides; with oxygen, forming oxides; and with carbonic, sulphuric, arsenic, silicic, and phosphoric acids, forming carbonates, sulphates, arsenates, silicates, and phosphates. Ores are commonly found in veins or lodes and in imbedded masses. A large part of the gold and silver bearing ores is of too low a grade to be profitable, and many tons are dumped aside as valueless. It is possible that improved methods of cheapening transportation to the smelters and treating the ores when placed there will yet cause much of what now is valueless to be used profitably. An electrical process of treating low grade ores was proposed by Edison, though only partial success has yet been obtained by means of it.

OREGON (ŏr'e-gŏn), a Pacific state of the United States, bounded on the north by Washington, east by Idaho, south by Nevada and California, and west by the Pacific Ocean. Its extent from east to west is 345 miles, breadth 275 miles, and area 96,030 square miles, nearly as large as the combined areas of Wisconsin and Kentucky. The state is crossed by two ranges of mountains from the north to the south, the Coast Range and the Cascade Mountains. In the northeastern part are the Blue Mountains, and in the southwestern part the Stein Mountains. The Coast Range trends along the Pacific Ocean at a distance of about twenty-five miles, though in many places the foot hills lie near the shore. The Cascade Mountains have the highest peaks in the state, and include Mt. Jefferson, height 10,000 feet; Mt. Pitt, 11,010 feet; and Mt. Hood, 11,230 feet. This mountain range is about seventy miles east of the coast range. Many of its peaks are snow-capped, and they include a number of extinct volcanoes.

In the southern part are several lakes, among them Upper Klamath, Summer, Albert, Christmas, Warners, Goose, and Malheur. Lakes Upper Klamath and Goose have an outlet into the Pacific by the Klamath River, but the others have no visible outlet to the sea. The principal drainage is into the Pacific Ocean by the Columbia River, which forms the greater part of the northern boundary. Among the rivers flowing into the Columbia are the Snake, Umatilla, John Day, Des Chutes, and Willamette. The Grand, Malheur, and Owyhee flow into the Snake, and the Roque and Umpqua discharge into the Pacific. Its general surface is diversified by many plains, valleys, and tablelands, all of which are more or less productive. The plains produce a bunch grass of value for pasturage, and in the mountains and valleys are regions covered with a wealth of beautiful forests, including such valuable varieties as oak, pine, cedar, fir, maple, hemlock, ash, cottonwood, and others. Its climatic conditions are somewhat diversified, owing to a difference of altitude, periodic winds, and mountain barriers, but as a whole the state is healthful and pleasant. The mean temperature in the northwestern part averages about 52°, and the rainfall about thirty-seven inches.

Oregon possesses many minerals of value, among them gold, silver, coal, sandstone, limestone, copper, nickel, iron, manganese, zinc, lead, chrome, quicksilver, platinum, and fire clay. The fisheries represent a vast value, especially the salmon fisheries of the Columbia River, but there are also considerable catches of other varieties in the streams, lakes, and on the coast. Agriculture is an important industry, representing a large production of wheat, oats, potatoes, flax, buckwheat, hay, corn, hops, and rye. The entire agricultural products represent a value of $38,950,000. Live-stock comprises horses, cows, other cattle, mules, and swine. Many varieties of small and large fruits are cultivated, including grapes, apples, pears, prunes, and cherries. There are extensive manufacturing interests, owing to its vast wealth in natural resources. Among the principal productions are flour, lumber products, woolen goods, hardware, machinery, sheet-iron, copperware, furniture, canned fruits, cured meat, canned salmon and fish, and clothing. The state as a whole has a large export and import trade, and the railroad lines are increasing rapidly, representing at present 2,075 miles.

Educationally Oregon has made rapid strides from its early history, and now maintains an excellent system of public schools and institutions of higher learning. High

schools are maintained in all the towns and cities, with a state university at Eugene to culminate the higher system. There is a state agricultural college at Corvallis, endowed by congress. It has three public normal schools. Normal training is given in several other colleges and high schools. A fine system of institutions is maintained for the care of the blind, deaf and dumb, feeble-minded, aged, and incorrigible. The principal higher institutions under private or denominational control include the Willamette University, Salem; Portland University, University Park; Pacific College, Newberg; McMinnville College, McMinnville; Pacific University, Forest Green; Philomath College, Philomath; Corvallis College, Corvallis; Collegiate Institute, Albany; and Lafayette Seminary, Lafayette. All the religious and civic societies are represented by a large membership. There are many libraries, growing civic societies, and numerous educational associations. The state has 215 periodicals, of which twenty-three are dailies and 155 are weeklies.

The first European to visit the region of Oregon was Drake, who cruised upon its coast in 1579. Vancouver, an English officer, surveyed its coast in 1792. The United States claimed Oregon because of the Louisiana Purchase, but this claim was not recognized by England, and in 1818 a treaty of joint occupancy was agreed upon. Lewis and Clarke surveyed the country in 1804-6, and John Jacob Astor founded Astoria in 1811. Spain ceded the rights claimed to the Oregon territory at the time of the Florida Purchase, in 1819; Russia ceded in 1821; France gave up title in the Louisiana Purchase, and in 1844 the occupation of Oregon entered into the political campaign with "fifty-four-forty" as an issue, meaning that the United States should occupy the region as far north as 54° 40′ north latitude. The democratic party being successful in that campaign, a war was threatened with England in 1846, and soon after the boundary line was extended to Fuca Strait. Oregon territory was formed in 1848. The present constitution was prepared in 1857, and in 1859 Oregon was admitted as a state. It is popularly called the Beaver State. Salem is the capital. The principal cities include Portland, Baker City, Astoria, Eugene, Salem, Pendleton, Albany, and Oregon City. The population, according to the census of 1900, is 413,536, including 18,954 colored inhabitants, or 4.6 per cent. Of the colored population 1,105 are Negroes, 2,501 Japanese, 4,951 Indians, and 10,397 Chinese. The males are in excess, constituting 56.3 per cent.

OREGON CITY, county seat of Clackamas county, Oregon, on the Willamette River, fifteen miles south of Portland. It is surrounded by a fertile agricultural and fruit-growing country and has modern municipal facilities. An abundance of water power is derived from the Willamette River. The manufactures embrace flour, paper, woolen goods, machinery, canned fruits, and utensils. It has a growing trade in merchandise. Population, 1900, 3,494.

O'REILLY (ō-rī'lĭ), **John Boyle**, author, born at Dowth Castle, Ireland, June 28, 1844; died in Hull, Mass., Aug. 10, 1890. His father was an instructor at the Netterville Institution, Dowth Castle, where the son secured a liberal education. He learned to set type in a printing office, and later became a reporter for various papers. He joined a British regiment in 1863 with the view of disseminating a sentiment favorable to revolution among the soldiers, and three years after was arrested on charges of high treason. After being found guilty on several counts, he was sentenced to life imprisonment, but this was afterward changed to twenty years service in the penal colony of West Australia, where he was transported in 1867. Two years later he escaped by means of a small boat, and, being rescued, he was taken to the Cape of Good Hope, and thence came to America. There he became a writer for "The Pilot," and in 1870 took a prominent part in the Fenian raid into Canada. Soon after he secured a controlling interest in "The Pilot," to which he devoted much of his time. He published "Songs of the Southern Seas;" "Stories and Sketches;" "Statues in the Block;" "In Bohemia," and "Songs, Legends, and Ballads."

OREL (ō-rĕl′), a city of Central Russia, capital of a government of the same name, situated at the confluence of the Orlik and Oka rivers. The surrounding country produces large quantities of hops, tobacco, cereals, and hemp, in which commodities it has a considerable trade. It is a market for horses and other live-stock. Among the manufactures are cordage, cotton and woolen goods, tobacco products, spirituous liquors, and machinery. It has convenient railroad connections, and is joined by canal and river navigation with the Caspian, Baltic, and Black Seas. There are good schools, a number of churches, and important municipal improvements. Population, 79,420.

ORELLANA (o-rāl-yä′nä), **San Francisco**, soldier and adventurer, born in Truxillo, Spain, about 1490; died in Venezuela, in 1546. He accompanied Pizarro on his famous conquest of Peru, and in 1539 served as an official of the El Dorado expedition. In 1541 he descended the Napo River, in company with sixty men, for the purpose of securing supplies, but soon determined to proceed to its mouth. After three days he reached the Amazon River, and, coming in contact with the Indians, he was told of a tribe of female warriors, or Amazons, from which he named the great river. He was also the first European to navigate that river to its mouth, reaching the Atlantic Ocean in 1541. Soon after he sailed to Trinidad and then to Spain, where a grant of land in the

new world was given to him, and he was fitted out with a fleet of four vessels and 400 men. In 1544 he made an unsuccessful attempt to conquer the regions of the Amazon, and was soon after obliged to retreat to Venezuela, where his death occurred.

ORENBURG (ō-rẹn-bo͝org′), a city of Russia, capital of a government of the same name, situated on the Ural River, near the Asiatic boundary. It is located on the slopes of a range of hills, has good railroad connections, and enjoys a considerable trade in cereals, live-stock, and merchandise. Among the manufactures are leather, clothing, cotton and woolen goods, soap, machinery, silk textiles, and ironware. The government of Orenburg has valuable deposits of salt, copper, gold, and iron. It has an area of 17,815 square miles, and a population of 1,715,625. The city was founded in 1742. It is the seat of several fine government and educational buildings. Population, 64,810.

ORESTES (ō-rĕs′teez), an important personage mentioned in Greek mythology. He was the son of Agamemnon and Clytemnestra, and the brother of Iphigenia. It is related that Clytemnestra and her lover, Ægisthus, murdered Agamemnon while Orestes was still a youth, and that the latter was rescued from an early death by his sister, Electra. Later he and Pylades avenged the murder of his father, but thereby incurred the anger of the Furies, and was pursued by them wherever he went, until he was informed by the oracle of Delphi that they could be pacified only by his conveying the image of Turian Artemis from Tauris to Attica. In this enterprise he was assisted by Pylades, who insisted in sharing the dangers of the undertaking, and the two proceeded to Tauris, where they were seized by the natives to be sacrificed in the temple of Artemis, but Orestes was recognized by Iphigenia as being her brother, and not only assisted them in escaping, but also made it possible for them to capture the coveted image. Subsequently Orestes recovered the kingdom of Mycenæ, lost at the death of his father, and, after the decease of the king of Argos, also ruled that country. Æschylus makes Orestes an important character in his tragedies, "Eumenides" and "Choëophori;" Sophocles in his "Electra," and Euripides in his "Iphigenia in Tauris" and his "Orestes."

ORGAN, a wind musical instrument, the largest and most important of all musical instruments. It contains a collection of metallic or wooden pipes made to sound by means of compressed air from bellows, and is played by means of keys. The organ is of great antiquity, and can be traced back to a small collection of pipes, from which it has gradually grown in the size and number of pipes until now a single performer is able to call into use several thousand. The ancient Greeks and others of remote date employed water to graduate the pressure of the compressed air upon the pipes, which entered from a chamber, hence their instruments were known as hydraulic or water organs. Organs of this form were in common use among the people of wealth from the earliest history of the Grecians, and continued popular in the Roman and Byzantine empires and in the reign of Charlemagne.

Three essentials are employed in the construction of all organs, but to these have been added a variety of mechanical devices for the purpose of increasing the beauty of musical effect. These essentials embrace a wind-box to contain compressed air; a number of pipes in communication with the wind-box to produce musical sound, and a key-board to supply communication at the pleasure of the player. After these essential parts of organ construction were perfected, additional progress was made by constructing instruments so that a single player could operate several instruments. Pedals were added to enable its being played, greater variety of tones were introduced, more power was centered in the bellows to supply a greater volume of air to the wind-box, and finally the soundboard was placed at the upper part of the wind-chest, a device by which air is conveyed to any particular pipe desired to be called into use.

The larger organs of modern construction are made of different systems of pipes, called partial organs, each of which is connected with a separate keyboard, often having four or five rows of keys, but all are in reach of the performer. A large church organ usually has three partial organs—the great-organ, the swell-organ, and the choir-organ. A fourth, called the solo-organ, is added to large concert organs, and sometimes a fifth is placed at some distance from the others, called the echo-organ. Pedal-organs are attached to either the church or concert organs, and are operated by the feet, having a keyboard for that purpose called a pedal. The keyboards to be operated by the hand are called manuals or claviers, and each partial organ usually has a manual with a compass of five octaves, ranging from the C below the tenor C; while the pedal has a compass commonly of twenty-seven notes, ranging from the C below the lowest manual C. The pipes range in length from less than one inch to thirty-two feet. They are divided into two classes—reed pipes and flute or mouth pipes—and the quality and character of their sound depend upon their dimensions, shape, and the material of which they are made. Air is admitted into the pipes by means of valves connected with the keys.

The several sets of pipes of each partial organ are called stops, and each stop has its own characteristic of tone, the quality of tone being designated as clarinet, flute, diapason, trumpet, vox humana, oboe, violin, bassoon, dulciana, etc. There are also mechanical combinations by which several stops or pedals may be operated at

once; organ couplers for joining keys in different manuals; swell-pedals, and tremulants for producing a trembling effect. The bellows for compressing air in the wind-box are worked by hand in small organs, and in the larger by a hydraulic or electric motor, or a gas-engine. Organs of large dimensions are abundant in the cathedrals and churches of Europe and America. Among the largest in America are those in the Chicago Auditorium, Cincinnati Music Hall, Brooklyn Tabernacle, and the Cathedrals of Boston and Montreal. The organs of much renown in Europe include the organ in St. Peter's, Rome; Notre Dame, Paris; and the organs at Haarlem, Seville, Strasburg, Utrecht, Berlin, Rotterdam, London, Paris, and Vienna.

The reed or cabinet organ is an American invention. The first was made by Aaron M. Peasley in 1818, and was known as a melodion. In this class of instruments the bellows are worked by the feet, and the reeds are generally worked on by suction instead of by blowing. Emmons Hamlin, in 1848, made an improvement by twisting and bending the reeds, thus increasing the capacity and quality of the tone. Extensive manufacture of this class of instruments began in 1854, when the Mason & Hamlin Organ Company commenced to place a superior article on the market known as the American organ. Since then these instruments have been improved in size and style, both of which are very various, and they have entered extensively into the homes and into missionary, Sunday school, and church work.

ORIGEN (ŏr′ĭ-jĕn), a father of the church and one of the most learned writers of his age, born in Alexandria, Egypt, in 185; died in Tyre, Syria, in 254. He descended from Christian parents, and in 202 his father suffered martyrdom under Emperor Severus. The support of the family fell upon the son, but he secured an education in Hellenic science and art under celebrated masters at Alexandria, and shortly after his father's death became catechist in the Alexandrian Church. Subsequently he was ordained a priest, led a life of rigid devotion, and even mutilated himself physically from an erroneous conception of the teachings expressed in Matthew xix. 12. He made a journey to Rome in 211, but the following year returned to Alexandria to engage as an advocate of the Christian faith, and in 228 was consecrated presbyter in Palestine. This distinction bestowed upon him caused the bishop of Alexandria to manifest a disposition of jealousy, and he was deprived of his priestly office and excommunicated in 232. However, the churches of the East remained his faithful supporters, and he was in great demand for service to the congregations in Palestine, Phœnicia, and Arabia. Works to the number of 6,000 are credited to him, and it is asserted that he employed constantly seven copyists and seven secretaries. Only a few of his works are extant, and those that have been translated are limited. The most important include his so-called "Hexapla" and "Tetrapla," both of which are important as Biblical criticisms. Other works partly extant include treatises "On Prayer;" "On Martyrdom;" "On the Resurrection," and eight books against Celsus.

ORINOCO (ō-rĭ-nō′cō), an important river of South America. It rises in the Parima Mountains, near the boundary between Venezuela and Brazil, and after a course of 1,570 miles, flows into the Atlantic Ocean by an extensive delta, near the island of Trinidad. The Orinoco drains a basin of 366,000 square miles, and is remarkable for being connected with the Rio Negro River, a tributary of the Amazon, by the Cassiquiari River, thus forming a natural canal between the two great river systems. In its upper course are several rapids and falls, and from these it is navigable to the Atlantic, a distance of about 815 miles. Its course is through a region of vast and luxuriant vegetation, and it receives a large number of tributaries, among them the Guaviare, Meta, Ventuari, Caura, and Caroni rivers. In the rainy season, which occurs from May to January, there are vast floods, often covering an extent more than a hundred miles, and the delta assumes at that time the appearance of an extensive sea. The valley of the Orinoco includes vast tracts of forest, and on its banks are a number of ports and trade stations. Humboldt was one of the first explorers of the Orinoco.

ORIOLE (ō′rĭ-ōl), a class of birds native to Eurasia, Africa, and the Indian Archipelago, though there are allied species in America, known as the Baltimore bird and the orchard oriole. The orioles proper have a bright-yellow color with wings and tail black, and in size resemble the thrushes, to which they are allied. More than twenty species have been described. The nests are built to hang from the smaller branches of trees. They have a loud, flute-like song, and are prized as cage birds. The eggs are of a shining white color, sometimes tinged with pink, and have small, dark-purple spots. These

ORIOLE.

birds feed on insects, seeds, and fruits. See **Baltimore Bird.**

ORION (ō-rī′ŏn), a giant hunter mentioned in Greek mythology, and reputed by Homer the most handsome man in the world. He was born in Bœotia. Writers repute him so large that he could wade the deepest seas. When on land, his shoulders reached the clouds, and, after falling in love with Eos (Aurora), he destroyed the wild beasts of the Ægean region for her protection. The father of Eos postponed the marriage until Orion became offended, and in a fit of inebriety his eyes were put out, but by exposing them to the rising sun his sight was restored. Subsequently Artemis slew him with an arrow, because the gods became offended on account of the love Eos bore him for his beauty. Some writers assert that he died by the sting of a scorpion, but all agree that he and the hounds that accompanied him in the chase were placed as a constellation in the heavens, known as Orion.

ORION, an ancient constellation, situated on the line of the equinoctial, and visible at some season of the year in every land. In the wintry sky it becomes one of the most clearly defined and conspicuous constellations in the heavens. The outlines are marked by four brilliant stars in the form of a parallelogram, and near the center are three stars forming the Belt of Orion. The outline of this constellation is supposed to resemble the human form of the mythic giant, Orion, for whom it was named. South of Orion are four stars called the Hare, which form a beautiful figure resembling that animal.

ORIZABA (ō′rē-thä′bä), a city of Mexico, situated in the state of Vera Cruz, sixty miles southwest of Vera Cruz. It is connected by railway with the principal cities of southern Mexico. Its site is on an elevation 3,970 feet above sea-level, but it is surrounded by a fertile country, producing cereals and fruits. Among the manufactures are cotton and woolen goods, tobacco products, leather, machinery, and earthenware. About twenty-five miles north of the city is Pico de Orizaba, an extinct volcano, having an altitude of 17,380 feet. Population, 20,720.

ORKNEY ISLANDS (ôrk′nē), an island group situated north of Scotland, and separated from it by the Pentland Firth, a channel averaging about seven miles in width. The group contains about ninety islands, of which twenty-eight are inhabited, and the total area is about 590 square miles. Poma, or Mainland, is the largest island. Others of considerable size include Hoy, Sanda, Westray, and Ronaldshay islands. It has a moist but healthful climate, and the winters are mild. None of the elevations are of considerable height, and springs and lakes are abundant. Fishing and farming are the principal industries, but there are manufactures of hosiery, straw hats, clothing, and utensils. The chief products include potatoes, barley, hay, oats, turnips, horses, cattle, sheep, swine, poultry, and many varieties of fish. Kirkwall and Stromness are the principal towns. The former contains the Cathedral of St. Magnus, founded in 1138, a museum with many valuable antiquities, and enjoys a considerable trade. The Orkney Islands were known to the ancient Greeks as Orcades, but little is known of their inhabitants until about the time of the Middle Ages, when they were inhabited by Picts and Northmen. Harold Haarfager annexed them to Norway in the 9th century. They remained under the Scandinavian sovereigns until 1468, when they passed as a dowry with Margaret of Norway to James III. of Scotland. Since then they have belonged to Scotland, and are now incorporated with Britain. The inhabitants consist of a mixture of Scandinavians and Scotch. Population, 31,060.

ORLEANS (ôr′lē-anz), a commercial city of France, capital of the department of Loire, on the Loire River, seventy-two miles southwest of Paris. It is an important railroad center, has canal connection from the Loire to the Seine and a convenient harbor on the river. The river is crossed by a number of splendid bridges, uniting the two portions of the city at convenient places. Orleans was formerly surrounded by walls, but these have been converted into boulevards. It has a fine public school system, a number of institutions of higher learning, several parks, landscape gardens, and beautiful statues and monuments. Electric lights, a number of libraries, and several theaters and museums are maintained. Its cathedral was partly destroyed in 1567 by the Huguenots, but was rebuilt by Henry IV., and besides it are several public buildings, including a palais de justice. Orleans was founded before the Christian era, and its Roman name, in 52 B. C., was Genabum. In 272 A. D. it was named Civitas Aureliani, of which its present name was formed. Attila besieged it in 451, but he was defeated by the Romans. Subsequently it passed successively into possession of the Franks and the Northmen, and in 1428 was relieved by Joan of Arc from a siege laid by the English under the duke of Bedford. The German army occupied it in the Franco-German war of 1870-71, and made it the base of their operations against the French army of the Loire. At present the city has extensive manufactures of bleached wax, hosiery, porcelain, sugar, cotton and woolen goods, leather, vinegar, spirituous liquors, and machinery. Population, 72,745.

ORLEANS (or-lă-ŏn′), **Duke of**, a title borne by three French dynasties. It was first given to Louis, second son of King Charles V., by his brother, Charles VI., in 1392. Louis afterward became regent, and is an important personage in the history of

France, being connected with the extended war between that country and England. Louis XII., grandson of Louis, became king in 1498, when the dukedom of Orleans was merged in the French crown. The title was revived in 1626, when Louis XIII. created his brother, Jean Baptiste Gaston, count of Blois and duke of Orleans and Chartres, but the latter died without male issue in 1660. Louis XIV. revived the title by creating his brother, Philippe, duke of Orleans and Chartres. The latter married Henrietta, sister of Charles II. of England, and the son born to that union, Philippe, was regent of France during the minority of Louis XV. Louis Philippe Joseph, grandson of the regent Philippe, assumed the surname of Egalite and became king of France, but was guillotined on Nov. 6, 1793. The son of Egalite, Louis Philippe, became king of France in 1830. The count of Paris is the present head of the royal family and royalist party of France, and is the grandson of Louis Philippe. He is known also as the duke of Orleans. He was born in 1838, and is a man of considerable education.

ORLEANS, Louis Philippe Joseph, Duke of, styled Philippe Egalite, born April 13, 1747; guillotined Nov. 6, 1793. He possessed much natural ability, but became engrossed largely in the gayeties of Paris, and for the extravagant habits acquired was regarded with disfavor by Louis XVI. His liberality and support of public charities made him popular among the people, and he spent some time in England, where he formed a friendship with the prince of Wales, and, after returning to France, introduced horse racing and other sports. In 1769 he married the daughter of the duke of Penthièvre, and in 1771 began to circulate pamphlets and books devoted to liberal political views. He became a leader of the notables in favoring a national assembly, for which he was exiled in 1787, and in 1789 was instrumental in assisting to convert the states-general into a national assembly. His ambition was to become a constitutional king of France, and with that view went over to the revolutionary party in 1792, assuming then the title of Philippe Egalité, meaning Philippe Equality. He not only favored the execution of Louis XVI., but voted for it, though the Jacobins looked upon this act with disgust, and by it his safety was threatened. Soon after he was imprisoned at Marseilles, but was acquitted by the committee of safety. Later he was tried by the Revolutionary tribunal in Paris, when he was condemned as a Bourbon and executed on the same day.

ORLEANS (or'le-ạnz), **Maid of.** See **Joan of Arc.**

ORMOND (or'mọnd), **James Butler, Duke of,** lord-lieutenant of Ireland, born in London, England, Oct. 19, 1610; died July 21, 1688. He descended from an illustrious family, was brought up under the supervision of the archbishop of Canterbury, since his father, the earl of Ormond, died while the son was quite young. He became commander-in-chief of the army sent in 1640 to suppress the rebellion in Ireland, and before the end of the year became lieutenant-general of the kingdom. His service was marked with ability, and his career was entirely satisfactory to the English, though the parties in Ireland took exceptions to his administration. In the long contest between parliament and Charles II., Ormond sided with the latter, and the policy in Ireland was shaped with that view, but when the parliamentary party attained success he crossed the channel into France. However, he soon after returned to Ireland for the purpose of restoring royal power, which he effected by granting the Irish free exercise of their religion, though the peace that followed was not lasting. In 1650 he returned to France, where he gave support to the king during his exile. In the meantime he returned several times on secret missions to England to secure correct information regarding public sentiment. He took up his residence in England at the time of the restoration of the king, and subsequently served in his previous position of lord-lieutenant of Ireland, where he remained till 1664. Colonel Blood attempted to assassinate him in London in 1670. The king conferred a dukedom upon him in 1683, and after that time he lived in retirement at Cornbury, but continued to advocate adherence to the Church of England.

ORNITHOLOGY (ôr-nĭ-thŏl'ŏ-gў), the branch of zoölogy that treats of birds, their form, structure, habits, and classification. It is sometimes divided into field and closet ornithology, the former relating to the study of living birds from observation in their haunts, and the latter to the study of dead birds by dissection. See **Birds.**

ORNITHORHYNCHUS (ôr-nĭ-thō-rĭn'-kŭs), an animal of Australia, the only genus of its class. It is characterized by webbed

ORNITHORHYNCHUS.

feet, short tail, very small eyes, soft and close fur, and a beak with mandibles shaped like those of a duck. This animal and the porcupine ant-eater of Australia constitute the lowest species of mammals. Its habits are aquatic, feeding on water insects, worms, and small mollusks. The feet have five

developed toes and are well adapted to aid the animal in swimming and for making burrows in the banks of streams. In some instances they construct houses near the banks, which often attain a height of from fifteen to twenty feet above the surface of the water, and in the upper end they form a nest. Though the general structure of this animal is mammalian, it is oviparous, and lays two eggs at a time. The young come forth in a blind and hairless condition, and feed by sucking milk from nippleless glands of the female. In the young the beak is short and flexible, and is adapted for sucking.

ORONTES (ō-rŏn'tēz), the name anciently applied to a river in Syria, now called Nahr el-Asi. It has its source between the Lebanon and Anti-Lebanon Mountains, courses toward the north to Antioch, and thence flows toward the west into the Mediterranean Sea. Its course is about 215 miles, but it is not navigable. The valley of the Orontes is fertile, containing splendid clusters of figs, laurels, sycamores, and other trees and shrubs.

ORPHEUS (ôr'fē-ŭs), a hero of Greek legend, son of Apollo and Calliope, and the muse of epic poetry. He is associated with many of the noted legends, and many places claim the honor of his birth. His intellectual qualifications distinguished him, while his musical endowments made it possible to charm all nature. The wild beasts of the forest became tame and gentle as lambs under the influence of his music, the mad and rapid torrents stopped their rapid course, and the mountains and trees moved from their places at the sound of his entrancing melodies. He became united in marriage to Eurydice, a beautiful nymph, daughter of the sea god Nereus, and their married life was full of joy and happiness. Shortly after their happiness was disturbed by Aristæus, who endeavored to win the beautiful Eurydice. In an attempt to escape she was bitten by a venomous serpent, from the effects of which she died. Orpheus thereupon engaged in unceasing lamentations and ventured into the gloomy depths of Hades for the purpose of recovering Eurydice. While in Hades he made such enchanting music by the sound of his lyre that the Furies shed tears, and the wheel of Ixion ceased to revolve. At length the stony-hearted king of Hades permitted him to take Eurydice back to the upper world on condition that he must not look back until he reached the earth. This condition he violated, and Eurydice vanished from his sight forever. Thereupon his grief became more intense than ever. He secluded himself from society, and, when invited by women to join them in performing the rites of Bacchus, he refused and was torn to pieces in their mad fury. Greek writers generally represent that his remains were collected by the Muses and buried at the foot of Mount Olympus, where a nightingale warbled a funeral dirge over his grave. Orpheus is mentioned as early as 530 B. C., and many of the most beautiful hymns and poems of mythology make mention of his name and the devotion he bore to Eurydice.

ORSINI (or-see'nee), or **Felice**, eminent patriot, born in Meldola, Italy, in December, 1819; guillotined March 13, 1858. He studied law at the University of Bologna, and in 1838 joined the Young Italy Society formed by Mazzini for the purpose of disseminating a revolutionary sentiment. He became identified with an insurrection in 1843, and the following year was sentenced at Rome to life imprisonment, but the amnesty proclamation issued by Pius IX. restored him to liberty. He was a prominent leader in the Revolution of 1848, and the following year became a member of the Roman parliament, but was arrested a second time, in 1854, and the following year sentenced to be executed. He escaped a few months later by cutting the bars of the prison cell and fled to England, where, in 1856, he published "Austrian Dungeons in Italy." His lectures on the condition of political affairs in Italy and his own adventures were sufficiently interesting to the British public to become patronized by large audiences. On Jan. 14, 1858, he made an unsuccessful attempt to assassinate Napoleon III. by exploding several bombs at the carriage in which the emperor and the empress were driving. In this scheme he was assisted by Pieri, Rudio, and Gomez, three Italian refugees. Rudio and Gomez were sentenced to life imprisonment, and Orsini and Pieri were executed.

ORTOLAN (ôr'tō-l*an*), or **Ortulan**, a species of birds of the bunting family. It is native to various parts of Eurasia and northern Africa. The ortolan is a migratory bird, spending its summers as far north as the Arctic circle, and passing to the Mediterranean and countries of southern Asia in autumn. The warble is pleasant and flutelike. Its length is about six inches, the color is yellowish-gray with brown wings, and the male has a particularly vivid hue. The bill is conical and small, and the tail is somewhat forked. Large numbers of these birds are caught with nets as they migrate, since their flesh is valued for its delicious flavor. In many countries the captured birds are fattened before they are killed for table use. The ancient Romans were fond of the ortolans, and they are still valued in Italy, Cyprus, France, and other countries, where they serve as a favorite food for epicures.

ORTON (ôr'ṭon), **James**, naturalist and author, born in Seneca Falls, New York, April 21, 1830; died in Peru, Sept. 25, 1877. He graduated at Williams College in 1855, studied theology at the Andover Theological Seminary, and in 1859 traveled in various countries of Europe and Asia. The follow-

ing year he joined the Congregational ministry, became a teacher of natural sciences in the University of Rochester, and in 1869 was elected to the chair of natural history at Vassar College, a position he held until his death. He was given charge of an expedition sent by Williams College in 1867-68 to search for fossils in South America. After crossing the Andes of Ecuador, the expedition descended the Napo River to the Amazon, and returned to the United States by way of Lima, Peru. He made a second visit to South America in 1873, when he ascended the Amazon and explored the regions of its source, but died while passing over Lake Titicaca. His writings include "The Andes and the Amazon;" "Liberal Education of Women;" "Comparative Zoölogy;" "Underground Treasures;" "Proverbialist and the Poet," and "Miners' Guide."

ORURO (ō-rōō′rō), a city of Bolivia, capital of a department of the same name, situated twenty-five miles north of Lake Poopo Choro. It is surrounded by a region containing vast deposits of gold, silver, lead, iron, copper, tin, and antimony. The lake has salty water, and in its vicinity are productive salt deposits. Oruro was founded in 1590, when silver was discovered there, and in the height of its prosperity possessed much wealth and a population of 70,000. Insurrectional movements and the discovery of mines of greater importance in the adjacent country have caused it to decline, and at present its population is only 13,500.

OSAGE ORANGE (ō′săj ŏr′ĕnj), a tree of the nettle family, so named from the Osage Mountains of Arkansas, where it is

BRANCH AND FLOWER OF THE OSAGE TREE.

native, but it is also found in other regions of North America. The leaves are glossy and alternate, and it bears a fruit somewhat resembling an orange in size and color, but it is not edible. It attains a height of from fifteen to sixty feet, this depending upon climate and treatment, and it yields a fine-grained yellowish wood that takes a high polish, and is used on account of its durability for paving blocks, fencing posts, and bridges. The leaves have been substituted for those of the mulberry as a food for silk worms, but the tree is used more largely for hedges. Its rapidity of growth, thorny branches, and ability to bear dwarfing make it of special value for all classes of hedge fencing. It may be grown from cuttings of the roots, but for hedging the plants are grown from the seed and afterward transplanted.

OSAGE RIVER, a river having its source in eastern Kansas. After a tortuous course of about 500 miles it flows into the Missouri River at Osage City, some distance below Jefferson City. It is joined by a number of tributaries in Missouri, courses through an agricultural and mining country, and in its valley are extensive forests. The Osage valley is highly fertile, producing cereals, grasses, and fruits.

OSAGES, an Indian tribe of North America, belonging to the Dakota family, and first met by Marquette on the Missouri in 1673. Later they occupied the regions of the Arkansas, and sided with the French against the English. In 1808 they ceded a part of their land to the government, and made several subsequent cessions. At the beginning of the Civil War 1,000 Osages moved toward the south, but entered into a treaty in 1865, and in 1870 they conveyed their lands to the government and removed to Indian Territory. The Osages prospered under governmental supervision. They include a large per cent. of persons advanced in educational and industrial arts, and possess valuable cultivated lands. Several literary works have been translated into their language.

OSAKA (ō′zä-kä), or **Ozaka**, a large city of Japan, on the island of Nippon, twenty-eight miles southwest of Kyoto. It has a fine location on the estuary of the Yodogawa, is a free port city, and has excellent connection by canals and railways. The surrounding country is fertile and produces large quantities of tea and cereals. Its streets are clean and regularly platted, intersecting each other at right angles. The city has manufactures of toys, machinery, clothing, cigars, edged tools, earthenware, and food products. Among its important buildings are the mint, a government college, a number of public schools, several colleges and hospitals, and about 1,400 Buddhist temples. Electric lights, telephones, waterworks, and street railways are among the improvements. It has a large trade in rice, tea, leather, and various manufactures. Population, 992,500.

OSCAR I. (os′kar), **Joseph Francis**, king of Sweden and Norway, born in Paris,

France, July 4, 1799; died July 8, 1859. He was a son of Charles XIV., who was known as Jean Baptiste Jules Bernadotte, and became crown prince of Sweden at the election of his father to the throne. He studied at the University of Upsala, where he developed remarkable ability in literature, science, and fine arts. In 1823 he married Josephine Beauharnais, granddaughter of Empress Josephine, and at the death of his father, in 1844, succeeded to the throne. His reign was one of liberality and justice, in which he gave liberal support to education, fostered manufactures, extended the civil rights of his subjects, and encouraged railroad building and other improvements. At the time of the Crimean War he declared neutrality, but his administration was adverse to Russia in sentiment. He published several treatises on penal law and education, and a number of songs, marches, and hymns. He had three sons—Charles XV., Oscar Frederick, and Augustus. The first named succeeded him as king of Sweden and Norway.

OSCAR II., Frederick, king of Sweden and Norway, born in Stockholm, Sweden, Jan. 21, 1829. He is a son of Oscar I., and a brother of Charles XV. After studying at several noted institutions, he entered upon extensive foreign travels. In 1857 he married Sophia, daughter of William, duke of Nassau. On Sept. 18, 1872, he succeeded Charles XV., and by a line of encouragement to railroad building, manufactures, and agriculture gave to his dominion a prosperous reign from the first. He made an extended visit to Norway and Lapland in 1873, and to Germany and Russia in 1875. King Oscar published a biography of Charles XII., and translated Goethe's "Tasso" and "Faust." He also wrote a volume of poems and prepared many able documents relative to national affairs.

OSCAR II.

OSCEOLA (os-se-ō'la), noted chief of the Seminole Indians, born in Georgia in 1804; died Jan. 30, 1838. He was the son of an Englishman named Powell and of a chief's daughter, and in infancy was taken to Florida, where he was brought up by the Indians. His training was devoted chiefly to the art of warfare, and he became influential among the Seminoles. He married the daughter of a fugitive slave, who was taken from him in 1835, and for threatening to revenge those implicated he was imprisoned by General Thompson. Six months later he killed the general and four others at Fort King, and thereby brought on the Second Seminole War. The everglades of Florida were his stronghold, where he headed a band of several hundred Indians and fugitive slaves, and succeeded in battling successfully against superior numbers for nearly two years. General Jesup took him prisoner in October, 1837, but this was done while he was holding a conference under a flag of truce. Osceola was imprisoned in Fort Moultrie, near Charleston, where he remained until his death.

OSCEOLA.

OSHKOSH (ŏsh'kŏsh), a city of Wisconsin, county seat of Winnebago county, on Lake Winnebago, at the mouth of the Fox River, eighty miles northwest of Milwaukee. The city has excellent railroad facilities, canal connections with the Wisconsin and Fox rivers, and a fine system of street railways. Among the manufactures are lumber products, flour, ironware, matches, furniture, coffins, vinegar, spirituous liquors, packed meats, machinery, vehicles, and tobacco products. The city has a fine public school system, gas and electric lights, waterworks, and a number of libraries. It is the seat of the northern Wisconsin insane asylum, a state normal school, several parochial schools, and numerous fine churches. The trade in live-stock, lumber, and manufactures is extensive. Within recent years it has developed a wide popularity as a summer resort, owing to its proximity to the lake and its numerous facilities for entertaining visitors. The site of Oshkosh was first settled in 1836, and it was important as a city in 1853. Population, 1900, 28,284.

OSIER (ō'zhēr). See **Willow**.

OSIRIS (ō-sī'rĭs), eminent Egyptian divinity, brother and husband of Isis, and with her a benefactor of Egypt in the introduction of religion, law, arts, and sciences. The Egyptians attributed to him the office of judging the dead, and regarded him the ruler of the kingdom in which souls are admitted to enjoy eternal felicity. Many of the writings of the Egyptians and Greeks mention him, and he is spoken of as the eternal ruler, manifester of good, king of the gods, and president of the west. These appellations and many others are found among the hieroglyphics on monuments accompanying his figures, and the funeral rituals recorded on papyri apply many others to him. Writers generally agree that Set, his brother, was the representation of the sum of evil agencies, and that he killed Osiris. He was held sacred under the form

of a human figure with a bull's head, or as the sacred bulls Apis and Mnevis. Under the form of the sacred bull Apis he was supposed to be ever present among men. The tamarisk, evergreen, and a kind of ibis were regarded his symbols. Osiris was not only worshiped in Egypt, but in Greece, Rome, and Asia Minor, though with the rise of Christianity he fell into disrepute. An account of the pilgrimage of the dead to Hades is given in the "Book of the Dead," where they are to meet Osiris before the judgment seat.

OSKALOOSA (ŏs-ka-lōō'sa), a city in Iowa, county seat of Mahaska county, fifty-two miles southeast of Des Moines. The surrounding country is agricultural and stock-raising, and contains extensive deposits of bituminous coal. It has excellent railroad facilities, gas and electric lights, fine public school buildings, street railways, and several libraries. Among the manufactures are flour, ironware, machinery, tobacco products, steam heaters, and earthenware. It is the seat of Penn College, a Friends' coeducational institution founded in 1873, and of Oskaloosa College, a Christian institution established in 1862. The city has a large trade in coal and merchandise. Population, 1900, 9,212.

OSMAN (ŏs'măn), **Nubar Pasha**, Turkish general, born in Tokat, Asiatic Turkey, in 1832; died Feb. 4, 1900. He studied in Constantinople, entered the cavalry in 1854, and rendered efficient services in suppressing rebellions in Syria, Crete, and the Yemca. In 1876 he was made commander of an army in the Turko-Servian War, and for remarkable bravery at Saitschar was promoted to the rank of field-marshal. In the war with Russia, in 1877, he commanded the Turkish forces at Plevna, where he repulsed attacks in July and September, and in December of the same year made a gallant attempt to escape from the besieged fort with 40,000 men, but was wounded and compelled to surrender. His skill at this notable siege gave him a wide reputation as a commander and engineer, and in 1878 he became commander-in-chief of the imperial guard. Subsequently he held the offices of governor-general of Crete, minister of war, grand-marshal of the palace, and several others of note in the Turkish Empire.

OSPREY. See **Fish-hawk.**

OSSIAN (ŏsh'an), an early warrior-poet of the Gaelic Celts, son of Fionn, or Finn, MacCumhaill. He flourished in the 3d century A. D. The best information secured in regard to this personage came in 1760-63, when James Macpherson, a schoolmaster, published several productions of an epic nature, entitled "Temora" and "Fingal." These publications were widely read and increased the interest in the traditional and heroic literature of the Gaels, though such writers as Johnson pronounced them fabrications and asserted that they were in most part the work of Macpherson. However, these writings brought to notice the adventures of Fionn MacCumhaill, which form the basis of the literature of the Fenians, and constitute a large part of the interesting writings of the early Scotch and Irish peoples.

OSTEND (ŏst-ĕnd'), a seaport city of Belgium, situated on the North Sea, in West Flanders, and connected with other cities by a number of railroads and steamboat lines. It is about sixty-eight miles west of Brussels. Ostend is surrounded by a fertile agricultural country, and has a large trade in dairy products, oysters, codfish, herring, poultry, and merchandise. Among the manufactures are cotton and woolen goods, sugar, clothing, tobacco, salt, candles, boots and shoes, chemicals, and machinery. The city has several fine parks, modern municipal facilities, and is celebrated as a summer resort, fully 20,000 visitors going there annually. It was founded in the 9th century, was besieged by the Spaniards in 1601, and capitulated to the French in 1745. Its later prosperity dates from the opening of the Ostend and Bruges Canal and the building of railways. The harbor is spacious and there are notable wharf improvements. Population, 25,265.

OSTEOPATHY (ŏs-tē-ŏp'a-thy), the name of an art or science of treating diseases, which was so termed from osteon=bone, and pathos=suffering. It is based upon the theory that the body contains within itself the elements requisite to cure all infirmities, and that all diseases are due mainly to a displacement of some bone, which, owing to its dislodgment, causes obstruction to the flow of one or more of the fluids of the body. The mode of treatment practiced by osteopaths consists chiefly in the adjustment of all parts and organs to their natural relations, which is done by pressing, rubbing, and otherwise manually treating the affected parts. The mechanical stimulation given is designed to remove obstructions to the vital forces and fluids, and also to induce more vigorous action in the organs, thereby aiming to incite greater energy. In this branch of healing it is particularly necessary that the practitioner be skilled in detecting the affected parts, and in determining the kind and amount of exercise to be applied to the different organs needing special treatment. A. T. Still, a physician of Kirksville, Missouri, is the founder of the science, which may be said to date from 1894. There are many schools and periodicals devoted to osteopathy, and in many states legislation has been influenced so as to permit its practice.

OSTRICH (ŏs'trĭch), a genus of cursorial birds, of which it is the type. They are native to the deserts of Africa and Arabia, and somewhat resemble the emu and cassowary. The ostrich is the largest of living birds, standing from six to eight feet high,

and has been known from remote antiquity. Xenophon and other ancient writers mention it, and it is frequently referred to in the literature of later Rome. Among its characteristics are that it has only two toes, which correspond to the third and fourth of other birds, a long, naked neck, small wings of little service in flight, and long and powerful legs, giving it great speed. Ostrichs are usually seen in flocks following antelopes, zebras, camels, and giraffes. Their principal means of safety against enemies is their remarkable speed, being able to exceed the fleetest horse. The plumage of the male is black, with white plumes at the ends of the wings and tail, and is much esteemed for ornamental purposes. In some places it is reared and domesticated on large ostrich farms, a good bird yielding annually from twenty to forty plumes. The hen is colored

OSTRICH.

somewhat differently than the cock, being more grayish and flecked, and as a whole its feathers are not so valuable. Ostrich feathers are prized principally for dress decoration, the back feathers being the most valuable, and those of the tail and wings taking the next rank. White plumes possess the greatest market value, the black being obtained by dyeing those partially colored by nature, and the price ranges from $75 to $200 per pound.

Ostriches are hunted on horseback, or by the hunter putting on an ostrich skin to enable him to come within shooting range. They only infrequently give any sound, and when they do it is somewhat like a cackle, but sometimes their cry is heard at a great distance, especially while in distress or when lost from their companions. The nest is made in the sand, where they lay the eggs, usually from eight to fifteen in the same nest, but these are from several hens. Ostrich eggs weigh about three pounds and hatch in six weeks. They are incubated by the hen and cock alternating, the cock usually occupying the nest at night, though in desert regions the sun has an assisting influence. The ostrich is a vegetable feeder, but, like domestic fowls, swallows stones and other hard substances to aid the gizzard in its functions. Ostrich farming is carried on mainly in South Africa, North Africa, California, and Australia. The industry is altogether for the feathers, since the flesh is rarely eaten, though that of the young is quite palatable. An average sized ostrich stands seven or eight feet high, and weighs from seventy to ninety pounds. In walking the stride is about two feet, but when running the average stride is twelve feet.

OSWALD (ŏs'wält), **Saint**, king of Northumbria, born about 604; died Aug. 5, 642. He was the son of King Ethelfrith, and on the death of his father, in 617, was compelled to take refuge among the northern Celts, where he embraced Christianity. He was elected to the throne in 635, and his reign was devoted largely to the spread of Christianity among his subjects, who included Picts, Britains, Scotch, and Angles. His death occurred in battle against King Penda of Mercia. He was canonized by the Church of Rome.

OSWEGO (ŏs-wē'gō), a city and port of entry of New York, county seat of Oswego county, on Lake Ontario, thirty-five miles northwest of Syracuse, at the mouth of Oswego River. It has connections with other trade centers by a number of important railroads, and has a large trade in lumber, agricultural products, and merchandise. Its manufacturing enterprises are facilitated by water power derived from the Oswego River. The products embrace cotton and woolen goods, starch, oil, matches, boilers, hardware, spirituous liquors, and edged tools. Among its municipal facilities are electric and gas lights, pavements, and waterworks. There are several parks and libraries, and a number of excellent public schools. It is the seat of a state normal school, the state armory, a modern county courthouse, and a number of fine churches. Its harbor is well protected by a breakwater and lighthouse, and there is a fine wharfage. Extensive jetties are at the mouth of the river. Settlements were first made in the vicinity of Oswego in 1720. It was taken by the French in 1756 and in 1812 by the British. Population, 1900, 22,199.

OTHMAN (ŏth-män'), or **Osman I.**, celebrated Turk, born in Bithynia in 1259; died in 1326. He was the son of Orthogrul, a chief of Oguzian Turks, and was chosen

successor to his father in 1289. In 1299 he succeeded in securing a part of Bithynia as an addition to his dominion, and soon after added Nicæa to his territory by obtaining a victory at the passes of Olympus. Othman was an ambitious ruler, and proceeded to extend the power of Turkish tribes in a wise and politic manner. His victories and organization of civic institutions formed the basis for the development of the present Turkish Empire, and from him the terms Ottomans, Osmanli, and Othmans originated. It is not certain whether he assumed the title of sultan, but writers credit him with coining money and with holding a court at Kara-Hissar.

OTHO I., called **Otto the Great**, emperor of Germany, son of Henry I., born in 912; died at Memleben, Thuringia, May 7, 975. In 936 he succeeded his father and was crowned emperor at Aix-la-Chapelle, and soon after centralized his influence by annexing Bavaria, Swabia, Lorraine, and other regions to his dominion. He became king of Lombardy in 951, and ten years later was crowned king of Italy. Soon after he took the oath of allegiance to Pope John XII., but afterward took up arms against him and placed Leo VIII. in his place on the papal throne. Later he defeated an army of Greeks in Lower Italy, and thus added still other possessions. It was during the reign of Otho that Christianity was extended to the Scandinavian countries.

OTIS, Elwell Stephen, soldier, born in Frederick City, Maryland, March 25, 1838. After graduating at Rochester University, New York, in 1858, he was admitted to practice law in New York, but in 1862 entered the United States army, remaining with the 140th New York regiment to the close of the war. He was breveted colonel for services at Spottsylvania, became brigadier-general for gallantry at Chapel Hill, and rendered efficient aid in the battle of Gettysburg. Later he took part in the battle of the Wilderness and at Petersburg and Weldon Road, and was mustered out of the service in 1865 as brigadier-general. The following year he received an appointment as lieutenant-colonel of the regular army, and served against the Indians from 1867 to 1881, and in the latter year organized the military school at Leavenworth, Kansas. He became commander of the department of the Columbia in 1893, was transferred to the department of Colorado in 1897, and in 1898 was ordered to the Philippines, serving the following year as a member of the Philippine commission. On Feb. 4, 1899, the Filipino insurrection began, and Otis commanded the American forces throughout the year. He ranks as a man of excellent judicial ability and a strict disciplinarian. In 1878 he published a work entitled "The Indian Question."

ELWELL. STEPHEN OTIS.

OTIS (ō'tis), **Harrison Gray**, statesman, born in Boston, Mass., Oct. 8, 1765; died there Oct. 28, 1848. His education was secured at Harvard University, and after studying law he was admitted to the bar in 1786. In 1796 he became a member of the state legislature, and served in congress as a federalist from 1797 to 1801. In 1803-05 he was speaker of the Massachusetts legislature, served for a long term of years in the state senate, and was United States senator from 1817 to 1822. Otis ranked as a popular public debater, was an able advocate of the anti-slavery cause, and became distinguished in debating the restriction of slavery in Missouri when that question was before the United States senate in 1820. He was elected mayor of Boston in 1829, and three years later retired from public life.

OTIS, James, patriot and orator, born in West Barnstable, Mass., Feb. 5, 1725; died in Andover, Mass., May 23, 1783. He graduated at Harvard University in 1743, and was admitted to the bar in 1748, but soon after settled at Boston, where he acquired a reputation as an able advocate. He was advocate-general at the time the British government adopted a coercive policy with its writs of assistance, in 1761, and this he not only opposed in a celebrated speech of five hours, but resigned his office in order to advocate the people's cause. Subsequently he was a member of the Massachusetts legislature, and in 1764 published a pamphlet entitled "Rights of the Colonies Vindicated." His influence was thrown in favor of appointing the stamp act congress, of which he became a member, and in that capacity delivered a number of able speeches against British oppression, and assisted in preparing the address sent to the British house of commons. His influence in favor of equality before the law and in legislation was in every case thrown in favor of the colonists, and adherents of the British became so bitterly opposed to him that a number of their officers, in 1769, beat him severely, on account of which he lost his reason. His death resulted from a stroke of lightning. Otis ranks as one of the eloquent orators of the period just preceding the Revolution.

OTTAWA (ŏt'ta-wa), a city in Kansas, county seat of Franklin county, fifty-four miles southwest of Kansas City, on the Marias des Cygnes River. It is conveniently connected by railroads, and surrounded by a productive farming and dairying country. In its vicinity are productive coal mines, by which its various manufactures are facilitated. The products embrace ironware, flour, castor oil, sorghum, soap, dairy prod-

ucts, furniture, and machinery. Among its buildings is a modern county courthouse. It is the seat of Ottawa University, and has electric lighting, pavements, and a number of excellent schools. The Ottawa University is co-educational, has twenty instructors, about 525 students, and a fine library. Population, 1900, 6,934.

OTTAWA, a city in Illinois, county seat of La Salle county, at the junction of the Fox and Des Plaines rivers, about sixty miles southwest of Chicago. It has convenient connections with other cities by railways and by the Illinois and Michigan Canal, and is surrounded by a fertile farming and dairying country. Its numerous fine buildings include the county courthouse, the Reddick library, a high school building, a number of fine churches, and the St. Francis Xavier Academy. The manufactures embrace glass, starch, cutlery, tile, cigars, pottery, clothing, lumber products, and machinery. Among the municipal facilities are electric and gas lights, electric street railways, substantial pavements, and waterworks. The city water is drawn from artesian wells in its vicinity, and near by are marble quarries and coal mines. Population, 1900, 10,588.

OTTAWA, a city of Canada, capital of the Dominion, situated on the Ottawa River, 120 miles southwest of Montreal. The city is finely situated, has excellently paved and platted streets, and is conveniently connected by a number of railroad and steamboat lines. Among the many excellent buildings are the residence of the governor-general; the government buildings, including the parliament house, a splendid structure of Potsdam standstone in the Italian-Gothic style; Victoria Tower, 180 feet high; Roman Catholic cathedral, with twin spires 200 feet high; and a number of schools and churches. It is the seat of the Ottawa University, the government normal school for central Canada, a museum, and several hospitals, colleges, nunneries, and convents. Among the manufactures are matches, leather, cast iron, flour, pottery, ironware, machinery, engines, clothing, and utensils. Ottawa has a large trade, both export and import, in various products and manufactures. The city derives water power from the Chaudiere Falls, forty feet high, on the Ottawa River, and smaller falls on the Rideau River. There is also transportation connection by the Rideau Canal. The city has electric and gas lights, extensive street railways, several public parks, and other municipal facilities. It was founded as Bytown in 1823, and its name was changed to Ottawa in 1854. It has been the capital since 1858. Population, 1901, 59,928.

OTTAWA, or **Grand**, an important river of the Dominion of Canada. It rises about 300 miles north of Ottawa City, and after a tortuous course toward the west enters Temiscamingue Lake. After passing through the lake, it flows toward the southeast and joins the St. Lawrence by two mouths, by which the island of Montreal is formed. It has a total length of 725 miles, and drains a basin of 70,000 square miles. In its course are several rapids and falls, including the Carillan Falls, above Rigaud; the Chaudiere Falls, near the city of Ottawa; and Les Chots Falls, about thirty miles above the latter city. Its course is through a valuable lumbering country, and vast improvements have been made by canals to facilitate lumbering. It has connection by a canal from Kingston to Rideau.

OTTAWAS, an American Indian tribe of the Algonquin family. They were originally resident in the northern part of Michigan, where they were first met by French explorers. The Ottawas were friendly to the French, whom they aided in the wars against the English, and in the Revolutionary War they assisted the latter. Treaties were made with them in 1785 and 1789, but soon after a war broke out between them and the Miamis, which was concluded by another treaty in 1795. Soon after they ceded their land around Lake Michigan to the United States, and a reservation was provided for a part of them on the Miami River, whence a number removed in 1836. A part of the tribe settled in Missouri, others in Indian Territory, and some are still found in the region north of Lake Superior. The Ottawas counted among their chiefs the celebrated Pontiac, and within late years a number of Indians advanced in educational arts have traced their lineage back to him and other warriors famous in the early history of America.

OTTENDORFER (ŏt'ĕn-dŏrf'ẽr), **Oswald**, journalist and philanthropist, born in Zwittau, Austria, Feb. 26, 1826; died Dec. 15, 1900. He studied at the universities of Prague and Vienna, came to the United States in 1871, and soon after began the publication of the "New Yorker Staats-Zeitung" in New York City, first as editor, and afterward became its proprietor. This periodical developed a marked influence in the political affairs of New York City and state, and also attained a wide circulation among the German citizens of the different states. Ottendorfer subsequently became president of the German Reform Association, and served as alderman of New York City in 1872-74. Among his philanthropic enterprises is the establishment of an educational institution in Zwittau, for which purpose he gave $300,000. He also founded a home for aged and indigent men, and gave $50,000 to establish the Ottendorfer Library in New York City.

OTTER (ŏt'tẽr), a class of carnivorous mammals of the weasel family, which includes about twenty species that vary greatly in size. The common otter measures a little over two feet from nose to tail. It has a tail about fifteen inches long, soft fur of a brownish color, webbed feet adapted

for swimming, and weighs about twenty pounds. Otters are found along the shores of streams and lakes, where they construct holes and channels through the ground, and subsist by feeding on fish, small birds, frogs,

SEA OTTER.

and other aquatic animals. In most varieties of otters the fur consists of long, coarse, and shining hairs, with a short under-fur of fine texture. The sea otter inhabits the coast regions of the North Pacific Ocean, weighs from fifty to seventy pounds, and bears a very beautiful and valuable fur. This species and most others are destructive to fish, particularly to salmon, and have been hunted until they are of rather rare occurrence in many regions of America formerly inhabited by them.

OTTERBURN, Battle of, a contest that occurred near the village of Otterburn, in Northumberland, in August, 1388, between the Scotch under Earl Douglas and the English under Harry Percy. It is important from a historical standpoint for the reason that the "Chevy Chase," perhaps the most famous of English ballads, and the "Scotch Ballad of Otterburn" are based upon this event, though the former ballad apparently does not date earlier than the beginning of the 17th century. It appears that Douglas, clad in armor, with his Scottish spears bravely led his countrymen against the assault under Percy, and after a most valorous fight was struck to the heart by an English arrow, but Sir Hugh Montgomery immediately dashed forward and struck his spear through the heart of Percy. The contest raged until the ringing of the curfew bell, and both sides claimed the victory. That both fought with remarkable valor was attested by the many nobles who lay bleeding on either side of the line of battle.

OTTOMAN EMPIRE. See **Turkey.**

OTTUMWA (ŏt-tŭm'wą), a city in Iowa, county seat of Wapello county, on the Des Moines River, eighty miles southeast of Des Moines. It is surrounded by a fine agricultural and dairying country, which contains valuable deposits of coal and clays. The city has excellent railroad connections, electric street railways, gas and electric lights, several excellent public schools, numerous churches, and many municipal conveniences. It is the seat of a normal school, an academy, and a business college. Several daily and a number of weekly periodicals are published in the city. Among the manufactures are linseed oil, starch, tobacco products, flour, cutlery, ironware, boilers, stoves, and packed meats. Its manufacturing enterprises are facilitated by excellent water power. It has a growing trade in merchandise, cereals, coal, and live-stock. Ottumwa was incorporated as a city in 1856. Population, 1900, 18,197.

OUDENARDE (ow-dęn-ar'dęh), a town of Belgium, in the province of East Flanders, on the Scheldt River, thirty-six miles west of Brussels. It has good railroad connections with other cities of the Netherlands, a fine Gothic council house, and manufactures of leather, cotton and woolen goods, and machinery. Oudenarde is important mainly because of several historic battles, among them the battle of 1674, when William of Orange conducted a long siege against the French. It was the scene of the celebrated victory of Marlborough over a French army under the duke of Burgundy on July 11, 1708. The town has a population of 8,350.

OUDINOT (o͞o-dē-nō'), **Charles Nicolas,** duke of Reggio and marshal of France, born at Bar-sur-Ornain, France, April 26, 1767; died in Paris, Sept. 13, 1847. He secured an early military training, entered the army in 1784, and in 1787 was given the rank of sergeant. In 1794 he was promoted general of brigade for gallant service on the frontier of Belgium, and in 1805 was awarded the cross of the Legion of Honor by Napoleon, who had made him commander of a grenadier corps of 10,000 men. With this force of men he distinguished himself at Austerlitz, Jena, and Ostrolenka, winning the last named battle on Feb. 18, 1807. Napoleon made him duke of Reggio and marshal of France for winning the battle at Wagram, and settled upon him an estate valued at $20,000 per year. He accompanied the army on the disastrous campaign into Russia, and in 1813 fought against the allied forces of Austria and Russia at Dennewitz and Grossbeeren. When Napoleon abdicated, Oudinot went over to the Bourbons, and after that gave them his undivided support. Louis XVIII. made him a peer after the second restoration. Subsequently he became minister of state, was decorated with the grand cross of St. Louis, and commanded the army of invasion in Spain in 1823, but in 1830 retired to his estates. In 1850 a statue was erected to his memory at Bar.

OUSELEY (o͞oz'lĭ), **Sir Frederick Arthur Gore,** composer, born in London, England, Aug. 12, 1825; died April 6, 1889. He was the son of Sir Gore Ouseley, a capitalist, graduated at Oxford, and in 1855 became a professor of music at that institution. He

attained remarkable success both as teacher of music and as composer, and gave his whole fortune as an endowment to St. Michael College in Tenbury, an institution for the training of choristers. His publications include "Treatise on Counterpoint and Fugue;" "Treatise on Harmony," and "Treatise on Musical Forms." He edited Naumann's "History of Music." His oratorios include "Hagar" and "St. Polycarp."

OUTRAM (o͞o'tram), **Sir James**, soldier and statesman, born in Derbyshire, England, Jan. 29, 1803; died in Paris, France, March 11, 1863. He studied at the Udny School, entered Marischal College, Aberdeen, in 1818, and the following year received a cadetship. In 1819 he went to India, where he won military distinction, and in 1825 was sent on a military mission to Khandesh, where he trained a light infantry corps. He became adjutant to Lord Keane, whom he accompanied in the Afghan War of 1839. After the capture of Khelat, he disguised himself as an Afghan merchant, and rode for 335 days through Afghanistan for the purpose of studying the region. He became chief commissioner of Oudh in 1856, and commanded the English army in Persia, whence he was called in 1857 to aid in suppressing a mutiny in India. After landing at Bombay, he received instructions from Lord Canning at Calcutta, and was dispatched to relieve Lucknow. For eminent services he received the thanks of parliament, was made a baronet, and was promoted to the rank of lieutenant-general. In 1860 he became a member of the supreme council in India, but soon after returned to England on account of impaired health, and took up his residence for medical treatment in France. Outram ranks as an efficient soldier and statesman. His remains were buried in Westminster Abbey, and his memory is prolonged by statues in Calcutta and London.

OVERBECK (ō'vẹr-bĕk), **Johann Friedrich**, celebrated painter, born at Lübeck, Germany, July 3, 1789; died Nov. 12, 1869. He studied art in Vienna and Rome, and was for nearly sixty years one of the leading German painters. In 1811 he formed the idea of founding a school of art in Rome, in which enterprise he was joined by Philip Veit, Wilhelm Schadow, and several others, and the institution exercised a large influence upon painting in Europe. His productions are noted for admirable composition, high excellence of coloring, and delicacy of finish. Many of his works have been engraved for use in various countries, and he also executed splendid frescoes in several houses and church edifices. His most famous pictures include "Influence of Religion on Art;" "Christ's Agony in the Garden;" "Incredulity of St. Thomas," and "Christ's Entry into Jerusalem." Among his frescoes may be named "Miracle of Roses of St. Francis," and productions illustrating the history of Joseph, among them "Selling of Joseph," and the "Seven Lean Years." His death occurred in Rome.

OVID (ŏv'id), **Publius Ovidus Naso**, celebrated Roman poet, born at Sulmo, March 20, 43 B. C.; died near the mouth of the Danube in 18 A. D. He received a careful education at Rome, where he also studied for the bar, and developed an early proficiency in oratory. After completing his education, he went to Athens to acquire a mastery of Greek, and traveled in Sicily and Asia Minor. He belonged to the social class entitled to entrance into the senate, but never entered that body, being prevented from aspiring to high dignity in political affairs by reason of his indolent habits and weakness of body, though he held several public positions of minor importance. Ovid possessed the essential genius of a poet, and his writings date from an early period in his life. He was much influenced by the Alexandrian poets, and dealt largely with the mythical tales of the Greeks. His residence was at Rome until his fiftieth year, where he enjoyed the friendship of a large number of distinguished men.

Ovid was married three times before his thirtieth year, and was the father of Perilla, for whom he manifested a tender fondness. His first two wives were divorced mainly because the restraint of marriage ties was distasteful to him, and before his third marriage he was associated on many occasions with the lady whom he celebrated as Corinna, but who was the accomplished daughter of Augustus, named Julia. An edict issued by Augustus in 9 A. D. required him to leave Rome and locate at Tomi, a town near the Danube delta, on the Black Sea. It is supposed that his banishment came about because of having published "Art of Love," though most writers regard this as a mere pretext, since the poem appeared fully ten years before, and it is thought that the intrigues with Julia were the real occasion. At Tomi his life was spent among a people whose language he did not at first understand, but he soon acquired a proficiency in it, and became popular there by reciting poems in honor of Augustus. However, he desired very much to return to Rome, for which purpose he and his friends addressed letters to the emperor without effect, causing him to remain there until his death. His writings were numerous, and many of them have come down to us. The most important include a number of letters of heroines to their husbands or lovers, entitled "Epistolæ Herodium;" love eulogies, entitled "Amorum Libri III.;" a poetical calendar, entitled "Fasti," and many volumes of others, including "Metamorphoses;" "Remedia Amoris;" "Ars Amatoria," and "Tristia."

OWATONNA, a city in Minnesota, county seat of Steele county, about sixty miles south of Minneapolis. It is located at the

junction of several railroads, giving it trade advantages in cereals, live-stock, and merchandise. The surrounding country is fertile. Among the manufactures are flour, earthenware, and machinery. It has several fine schools, a modern county courthouse, and good municipal improvements. Population, 1900, 5,561.

OWEN (ō'ẹn), **Sir Richard**, anatomist and zoölogist, born in Lancaster, England, July 20, 1804; died in London, Dec. 19, 1892. He studied in the Lancaster grammar school, took a course in medicine in Edinburgh and London, and in 1834 was appointed professor of comparative anatomy at St. Bartholomew's Hospital, having previously served as an assistant curator in the Hunterian Museum. In 1836 he became professor of anatomy at the Royal College of Surgeons, and in 1856 was made superintendent of the natural history department in the British Museum, where he took advantage of the excellent facilities offered there for studying living and extinct animals. Owen is classed among the most eminent students of anatomy and fossils since the time of Cuvier, whom he met at Paris. He maintained a friendly but conservative view in regard to the theory of modern evolutionists. The honors of knighthood were conferred upon him in 1879, and he was shown many distinctions by the leading scientific societies of America and Europe. His publications embrace a large number of valuable works, among them "Fossil Reptiles of South Africa;" "Extinct Wingless Birds of New Zealand;" "Fossil Mammals of Australia;" "Lectures on the Comparative Anatomy of the Vertebrate Animals;" "Extinct Marsupials of England;" "History of British Fossil Reptiles," and "Memoir on the Pearly Nautilus."

OWENSBORO (ō'ẹnz-bŭr-rō), a city of Kentucky, county seat of Daviess county, on the Ohio River, seventy-five miles southwest of Louisville. It is finely situated and has good railroad and steamboat connections. The surrounding country is noted for its production of cereals, lumber, and minerals. It has a large trade in tobacco, live-stock, lumber, and merchandise. Among the manufactures are tobacco products, spirituous liquors, cotton and woolen goods, wagons, carriages, flour, ironware, canned goods, earthenware, and machinery. It is the seat of a woman's college, has good public schools, a large theater, and a United States government building. The facilities include gas and electric light, macadamized streets, waterworks, numerous churches, and a public library. Population, 1900, 13,189.

OWL, a large group of birds of prey, including fully 150 species, about forty of which inhabit America. They are distinguished chiefly on account of their nocturnal habits. The different species have a short head, a circular or triangular facial disc, large eyes and ears, the outer toe reversible, and, owing to the soft plumage, a noiseless flight. Most owls are nocturnal in habit, flying about at night in search of food, their full and prominent eyes with large pupils making it quite possible to move with safety at twilight or after night. The plumage is

SCREECH OWL.

variously colored in the different species, but it is mostly brown and yellow shaded with various spots or bars, and is remarkably downy. Those subsisting by catching fish have the toes and tarsi quite bare of feathers, but other varieties have feathers extending to the base of the claws. Mice constitute the favorite food of owls, but they also search for other small animals and insects. The hollows of trees, crevices of rocks, old buildings, and isolated caves are favorite haunts during the day, where they build their nests and rear their young.

Owls cast up the indigestible parts of the food swallowed in the form of pellets, and these castings occur principally under their roosts. They show that these birds are of service to man in destroying rats and mice. If taken young, most species may be tamed, particularly the familiar barn owl. When irritated, this species gives out a hissing sound while snapping its mandibles, and most varieties have a rather pleasant hoot. The species vary from five inches to two feet in length, and occur in all parts of the habitable globe, but the barn owl

HORNED OWL.

has by far the greatest distribution. Among the more common varieties are the brown owl, the long-eared owl, and the eagle owl. These species are widely distributed in America and Europe. The snowy owl is of common occurrence in the northern part of Europe, and the short-eared owl is of wide distribution in woody countries and in moorlands. The screech owl is noted for its discordant scream, and occurs widely distributed, while the Boobook owl is a species common to Australasia. A class known as burrowing owls is common to America and the West Indies, and is peculiar on account of burrowing in the ground and for frequenting the burrows of the marmot, or prairie dog. The snowy owl and hawk owl are not nocturnal in their habits. The former has remarkably snowy plumage and large size, and the latter is migratory.

OWOSSO (ō-wŏs'ō), a city of Michigan, in Shiawassee county, on the Shiawassee River, seventy-eight miles northwest of Detroit. It is an important railroad junction, derives an abundance of water-power from the Shiawassee River, and is surrounded by a fertile agricultural and dairying country. Among the manufactures are ironware, carriages, coffins, clothing, lumber products, cigars, flour, and machinery. The city has a fine school system and modern municipal facilities. Population, 1904, 9,145.

OX, a bovine quadruped of the genus bos, including the species known as the common ox, the buffalo of North America, the bison or yak of Eurasia, the zebu or Indian ox, the buffalo of Eurasia, and many others. The common ox has been known from remote antiquity. In India it still possesses a sacred character. It is one of the most useful animals to man, serving him while living as a beast of burden and draught, and the female yields milk of abundance and much richness. It is a prolific source of animal food, while its bones, skin, hair, hoofs, horns, and, in fact, all parts are of value for divers purposes. When the name is applied to the male, it has various significations. A male animal less than a year old is designated as bull-calf or ox-calf, and after that as a bull, if not castrated. A castrated male is called a steer.

OXFORD (ŏks'fȯrd), county seat of Lafayette county, Mississippi, thirty miles south of Holly Springs. There are convenient railway connections, and manufactures of cotton goods, canned products, and utensils. It is the seat of the University of Mississippi, an institution founded in 1844, and which now has twelve university buildings, extensive courses of study, and a library of 16,000 volumes. The city also contains the Union Female College and Warren Institute. Population, 1900, 1,825.

OXFORD, a town of Butler county, Ohio, thirty-eight miles northwest of Cincinnati. It is pleasantly situated in the Miami valley, has good railroad facilities, and is surrounded by a fertile agricultural country. Among the manufactures are agricultural implements and earthenware. It is the seat of the Western Female Seminary and Oxford College. The latter dates from 1849, and has thirty instructors, 250 students, and a fine library. Miami University is also situated there. It was founded in 1809, when a tract of land was set aside for that purpose by the state of Ohio. This institution has advanced courses of study and a library of 15,000 volumes. Population, 1900, 2,009.

OXFORD, a city of Oxford county, England, noted for its celebrated university. It is situated at the confluence of the Cherwell and Thames rivers, fifty miles northwest of London, with which it is connected by a number of important railways. The older part of the city is located on a rectangle formed by the two rivers, but the newer portions extend over the undulating region beyond. The surrounding country is fertile and productive. Among the principal buildings are those of the university, and besides them it has a number of structures of historic interest. These include the Clarendon Building, in which the Clarendon press was located up till 1830; the St. Michael's Church, dating from 1070; a number of excellent churches, several colleges, a theological school, a public library, and the town hall. It has a number of fine statues and monuments, including Martyr's Memorial, a cross erected in 1841 to commemorate Latimer, Ridley, and Cranmer. The city is first mentioned as Oxnaford, probably having reference to a ford for oxen across the rivers. In 802 it contained several educational institutions, and afterward became the residence of Kings Alfred and Canute. William the Conqueror captured the city in 1068. In the reign of "Bloody Mary" occurred the execution of Latimer, Ridley, and Cranmer, and in the 17th century it was made the headquarters for a brief period by the royalists. It has a number of manufactories and a considerable trade, but depends principally upon its convenient and attractive location and the university for its subsistence. Population, 46,310.

OXFORD, University of, a celebrated institution of learning situated in Oxford, England. Oxford and Cambridge universities constitute the two most important educational institutions of Great Britain, each of which embrace a number of colleges organized as distinct corporations, though all belong to the universities proper. Oxford University is constituted of twenty-one colleges and two halls, the oldest, University College, dating from 1253. However, some writers think that Merton College, founded in 1264, should be considered the oldest, since it was the first to adopt a collegiate system by giving instruction in halls.

The following is a complete list of the colleges: University College, established in

1253; Merton College, 1264, but not joined to Oxford until in 1274; the mother of John Baliol, king of Scotland, founded Baliol College in 1268; King Edward II. founded Oriel College in 1326; Queen's College was founded in 1340; All Souls' College, in 1347; Queen Elizabeth founded Jesus College in 1571; and the others include Exeter College, New College, Lincoln College, Magdalen College, Corpus Christi College, Christ Church College, Brasenose College, Trinity College, St. John College, Wadham College, Worcester College, Pembroke College, Keble College, and Hertford College. Besides these are two similar institutions known as St. Edmond Hall and St. Mary Hall, which differ in that they are not incorporated. There are three colleges for women, known as Margaret Hall, Summerville Hall, and St. Hughes Hall. In 1884 women were admitted to the examinations, but degrees are not issued to them. Other connected institutions embrace the Radcliffe Library, botanic gardens, Bodleian Library, Taylor Institution of Modern Languages, Ashmolean Museum, University Museum, Indian Institute, and the Observatory. Three other affiliated colleges organized since 1880 are the University College, at Nottingham; David's College, Lampeter, and Firth College, Sheffield. The university proper has about fifty professorships, and is attended by about 3,500 students.

Oxford University may be attended by anyone qualified to pass the examinations, there being no restriction as to creed, birth, or age. Instruction is given largely by tutors, but there are lectures at regular intervals by the professors, and the head of the university is centered in the chancellor, who is usually chosen from the nobility. The position of chancellor may be considered honorary, since the judicial and executive authority is exercised almost exclusively by the vice-chancellor, who is appointed by the chancellor. The hebdomadal council, the congregation of the university, and the house of convocation are the governing bodies. All the legislative proposals originate in the hebdomadal council, which is constituted of twenty elective or official members. The congregation of the university is constituted of professors and officials, and includes all members of the convocation resident in Oxford. In that body is vested the power to reject, amend, or confirm proposals originated in the hebdomadal council.

All the registered masters and doctors constitute the house of convocation, and in it is vested the power to elect two members to parliament, transact the general business, and elect to office nearly all officials of the institution. Each college has rules of its own for the government of its students and classes, but all are subject to a general constitution. The courses are extensive and diversified, the degrees including bachelor and master of art, and bachelor and doctor of civil law, medicine, divinity, and music. The students maintain many of the usual college societies, organize games, and support various clubs. There are splendid grounds and gardens in connection with the university. Its libraries are among the best of Great Britain.

OXUS, or **Amu**, a river of Central Asia, now generally called Amoo Darya or Jihoon. It rises in Lake Sar-i-Kol, in the plateau between the Hindu Kush and Thian Shan Mountains, and after a general course of about 1,275 miles toward the northwest, flows into the Aral Sea. It has a number of important tributaries, among them the Panja River, and at its mouth is an extensive marshy delta about ninety miles long. Before the Christian era the Oxus flowed into the Caspian Sea, a fact recently demonstrated by exploring its former bed, the change being due to the action of water on an alluvial soil. It is navigable for about 275 miles from the Aral Sea, and vast quantities of water are drawn from its upper course for irrigation purposes. The valley of the Oxus contains many remains of ancient peoples, and the region surrounding its source is regarded by some writers as the cradle of the human race.

OXYGEN (ŏks'ĭ-jĕn), the most abundant and important gaseous element yet discovered, which forms by weight about one-half of the mineral, four-fifths of the vegetable, and three-fourths of the animal kingdoms. By volume it constitutes one-fifth of the atmosphere and by weight eight-ninths of water. It has neither taste nor color, and is odorless. It is a little heavier than air, its density being 1.1056; is almost insoluble in water, and is the most magnetic of all the gases, though it is the least refractive. Oxygen unites with all the elements except fluorine and bromine, forming with some elements alkalies, with others acids, and with others neutral substances, and when so united the product is called an oxide. Oxides embrace the most important chemical compounds. Fire, artificial light, electricity, and electro-magnetism depend largely upon the presence of oxygen, and mechanical power derived from combustion depends upon oxidation. Animal life is dependent upon the inhalation of oxygen. With every inspiration of air this gas is carried to the lungs, whence it is passed to the different parts of the body by the blood, and in the tissues forms a union with the tissue elements. The blood deprived of its oxygen becomes the venous blood, which is returned to the lungs to be again mixed with oxygen and sent anew into the system as the bright arterial blood. Oxygen was first discovered by Eck, a chemist of Sulzbach, Germany, in 1489, and was independently rediscovered by Priestley and Scheele in 1774. Lavoisier made experiments with it the following year and named it oxygen. It can be converted into a liquid state under

the influence of great cold and high pressure.

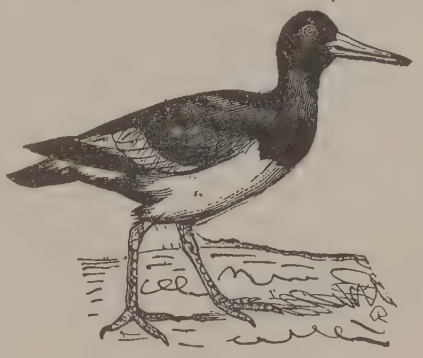
OYSTER (ois'tẽr), an edible bivalve mollusk, closely allied to the mussels, and which forms an important article of commerce. Oysters are found near the shores of salt and brackish water, where they are moored by the left shell to stones or other hard substances. They feed principally on microscopic beings and particles of organic matter which they take in from the currents of water by the mouth at the hinge end of the shell. The spawning season occurs from May to September, when they are not caught for food, each oyster producing from 200 to 1,000 ova. The eggs produce an embryo oyster of minute size, which is inclosed in a transparent shell, and supplied with a cilia by which the little animal is able to float with perfect ease until it becomes able to fasten itself to some stable object, though in this form many thousands are consumed by fishes and other forms of animal life. It requires from three to four years for oysters to mature. They form large congregations, called oyster beds, at the bottom of the water, where they are caught with a kind of dredge, or iron rake drawn by means of a sailing boat. The most important oyster beds are found where the bottom of the sea is made up of gravel and mud deposits, and where the current is not sufficiently strong to displace them from their moorings.

In the winter time oysters accumulate a deposit of protoplasm, a highly nutritious and digestible food, when they are said to be fat. This so-called fatty substance is consumed during the reproductive period in the summer, when the oyster is not considered nutritious. The most productive oyster fields in America are found in the inlets and coast regions of Chesapeake Bay and Long

INSIDE VIEW OF AN OYSTER.

Island Sound. Baltimore is the greatest oyster market in the world, being near the oyster fisheries of Chesapeake Bay and the Atlantic. Other valuable oyster beds occur in the Gulf of Mexico, in Puget Sound, and in the Strait of Fuca. The oysters of the Pacific coast are smaller than those of the Atlantic, but artificial culture of species taken from Chesapeake Bay has made material progress in many regions of the Pacific coast. Productive oyster fields are also found in Europe and other regions. They were cultivated artificially as early as the rise of the Roman Empire. In many localities the supply has been exhausted, but oyster culture is extending continually. The oyster product of the United States averages annually 29,500,000 bushels, which is about five-sixths of the world's supply.

OYSTER CATCHER, a wading bird closely allied to the plover. It is easily known from its red feet and bill, the latter



OYSTER CATCHER.

being twice as long as the head. The plumage is black and white and the wings are long and pointed. Its bill is truncated at the end and has the shape of a wedge. The bird measures about sixteen inches in length. It is widely distributed in America, Eurasia, and other grand divisions, but the species of different regions are various, numbering about ten. The oyster catcher inhabits seacoasts, where it feeds on small mollusks caught at tide marks. Its cry is loud, resembling the syllables, "wheep, wheep, wheep."

OZARK MOUNTAINS (ō-zärk'), a group of mountains situated principally in southwestern Missouri, and extending into northern Arkansas and northeastern Indian Territory. The highest elevations do not exceed 2,000 feet. Their slopes are covered with vast forests, and their mineral deposits are enormous, including lead, coal, iron, and many others. Many valleys penetrate different parts of the group, which are rich in cereals, live-stock, and orchards.

OZONE (ō'zōn), a colorless gas regarded an active form or condition of oxygen. It is nearly always present in the atmosphere, where it apparently is formed by sparks of electricity passing into dry air. Ozone has a pungent odor like that of metal, which may be noticed after a discharge of lightning, and when setting in motion an electrical machine. The oxidizing effect of ozone is much greater than that of oxygen, since two volumes of it contain three vol-

umes of oxygen, hence it serves a very useful purpose in purifying the atmosphere by destroying impurities resulting from the decomposition of animal and vegetable matter. Ozone is manufactured in abundance at a small cost by means of electricity, and is rapidly entering the arts as an oxidizing agent. It serves for maturing wine and spirits, drying and thickening oils, seasoning linoleum, sterilizing drinking water, ageing wood for use in manufacturing musical instruments, and for many other purposes in the arts and industries.

P

P, the twelfth consonant and sixteenth letter of the English alphabet. It is classed as a mute, non-vocal, and labial, and is formed by compressing the anterior part of the lips. In many Greek derivatives the initial p is silent, as in psalm, pneumatics, and pterodactyl, and it is rarely silent in the middle of a word.

PACHUCA (pä-chōō'kä), a city of Mexico, capital of the state of Hidalgo, located fifty miles northeast of the City of Mexico. It has good railway connections, is surrounded by a region containing rich deposits of silver, and has manufactures of clothing, machinery, salt, metal products, and utensils. The city is in a beautiful valley between elevated mountains. Bartolomeo Medina, in 1557, discovered at this city the process by which sulphide of copper, mercury, and salt may be used in extracting ore. Population, 36,150.

PACIFIC OCEAN, the largest of the five oceans, situated west of North and South America and east of Asia and Australia. It was so named by Magellan, the first European navigator to cross it, which name he applied because of finding it calm. Its extent from north to south is 9,000 miles, width from east to west 10,000 miles, and estimated area 70,309,000 square miles. This vast expanse of water includes about one-half of the water surface of the earth, and exceeds in extent the area of all the continents. North of it is the Bering Sea, which connects with the Arctic Ocean through Bering Strait, and south of it is the Antarctic. It is usually divided into the North and South Pacific, owing to a shallow running almost centrally through it from east to west. The North Pacific is somewhat the larger and has a mean depth of 15,420 feet. Its greatest depth is nearly 30,000 feet, being about equal to the height of the highest mountain in the world. The South Pacific has a mean depth of 14,200 feet, and its greatest depth is 19,230 feet. Its bed is not only more uniform than the Atlantic, but the average depth is somewhat greater. The greatest depths occur northeast of Japan, though there are depths that approximate the greatest depths in the vicinity of the Ladrone Islands, and also in the regions south of the Friendly Islands.

A region of calms exists along the equator. The presence of a large number of islands causes the trade winds to be more irregular than those of the Atlantic, and to the north and south of them are other calm regions. An equatorial current passes northward along the eastern coast of Asia, and divides in the vicinity of the Philippine Islands, where it forms northern and southern branches; the southern branch returning in part to form the equatorial counter current, while the northern branch flows northeast along the Asiatic coast as the Kuro Sivo. It flows eastward at about 50° north latitude as a North Pacific current, and when near the shores of North America it turns in a southern direction. The southern equatorial current of the Pacific is formed into a number of branches by islands in mid-ocean, and from the Australian continent it passes southward and is merged into the cold Antarctic current. From these principal currents flow numerous branches in various directions, the principal ones being the current of Bering Strait and that of Cape Horn. Tides do not rise as high on the coasts of the Pacific as they do on the Atlantic for the reason that it is not characterized by bays as favorable to the rise of water to great elevations; the average tide height being about ten feet at various points on the western coast of North America. Their greatest heights occur in the Bay of Panama, where they attain to about fourteen feet.

The Pacific Ocean has many large continental inlets and seas, particularly on the Asiatic coast, where occur the Bering, Okhotsk, Japan, and China seas. In the island archipelago southeast of Asia occur the Celebes, Manda, and Coral seas. The principal inlets bordering on the American coast include the Gulf of California and the Bay of Panama. The largest inflow of rivers is from Asia, where the Amur, Hoang-ho, Yang-tse-Kiang, Menam, and Mekong flow into articulated seas. Among the principal rivers of America flowing into it are the Colorado, Columbia, Sacramento, Fraser, and Yukon. There is no material inflow from South America, since its watershed is situated along the Pacific coast and the drainage is principally toward the east. The Pacific has many excellent islands, extending from the center toward the east. Among the principal island groups are the Hawaiian Islands, the Polynesian, the Micronesian, New Zealand, the Melanesian, the Philippines, Borneo, Celebes, the Japanese Islands, and Saghalien. The principal island groups near the American shore include the Aleutian, Queen Charlotte, Vancouver, Galapagos, and a considerable archipelago along the coast of Chile. Balboa, a Spanish explorer, discovered the Pacific in 1513, when he sighted it from a mountain in the Isthmus of Panama. Magellan passed through the Strait of Magellan, and then

sailed across the Pacific from the east in 1620. Among the navigators to explore different regions in the 17th and 18th centuries are Tasman, Vancouver, Drake, Byron, Behring, Comte de La Perouse, and Bougainville. Maclure discovered the Northwest Passage into the Arctic in 1850, and Nordenskjold the Northeast Passage in 1874.

PACIFIC RAILROADS, the term applied to a number of important railway lines extending from the Missouri River to the Pacific coast. These railroads were built under an act of congress passed June 24, 1862, and approved by President Lincoln on July 1. By this act of congress government aid was extended for the purpose of furthering the enterprise. The aid consisted of a land grant of 6,400 acres per mile, while government bonds bearing 6 per cent. for thirty years to the amount of $16,000 per mile were issued for branch lines and for the level regions of the main line extending from Omaha to the Rocky Mountains, and from the Sierra Nevadas to San Francisco; while the subsidy for the two mountain regions was $48,000 per mile, and for the plateau region between the Rocky Mountain and Sierra Nevada region $32,000 per mile. These grants were made to facilitate the development of the vast region west of the Missouri and to connect the Pacific coast by rail with the east. The companies to construct the railway lines agreed to complete the roads by July 1, 1876; to extend railway and telegraph rates to the United States as cheaply as to private parties; to pay 5 per cent. of the net earnings into the treasury of the United States, and to pay to the government the full amount of the principal of the bonds at their maturity, and the stipulated interest as it became due.

The railway lines built under this act are the Union Pacific, Central Pacific, and Kansas Pacific railroads; but the companies were embarrassed financially at various times, and in 1864 the land grant was increased to 12,800 acres per mile, making the total to all companies about 39,000,000 acres. In 1869 the Central Pacific and Union Pacific were completed. The Credit Mobilier (q. v.) managed the construction and finance of the Union Pacific, and became involved in a legislative scandal. Subsequently a land grant of 47,000,000 acres was given to the Northern Pacific. The office of commissioner of railroads was instituted in 1870 to supervise the accounts of the Pacific railroads. Many million dollars of the debts have been paid by the government, and it is proposed that the government claim against some of the lines be funded in long-time bonds at a low rate of interest.

PACKARD (păk'ard), **Alpheus Spring**, naturalist, born in Brunswick, Maine, Feb. 19, 1839. He was the son of A. S. Packard (1798-1884), who was for some years president of Bowdoin College. The son graduated at Bowdoin College in 1861, studied medicine at the Maine Medical College, and served in the latter part of the Civil War as an army surgeon. In 1871 he became state entomologist of Massachusetts, and in 1878 professor of zoölogy at Brown University. Packard was selected to serve on the United States Entomological Commission, and is the author of authoritative works of various kinds. His principal publications include "Our Common Insects;" "Insects of the West;" "Zoölogy for Students and General Readers;" "Guide to the Study of Insects;" "Observations on the Glacial Phenomena of Labrador and Maine;" "Life Histories of Animals," and "Naturalist on the Labrador Coast." He was also for some time an editor of the "American Naturalist."

PADEREWSKI (păd-ę-rōō'skĭ), **Ignace, Jan**, noted Polish pianist, born in Podolia, a Russian-Polish province, Nov. 6, 1860. At the age of three years he was able to play on the piano, and when seven years old was placed under an instructor. In 1872 he began to study under Roguski and Kiel in Warsaw, and four years later made a musical tour through Russia, Roumania, and Siberia. He became professor of music in Warsaw Conservatory in 1878, and in 1884 in the conservatory of Strasburg. Subsequently he took advanced musical work in Berlin and Vienna, studying in the latter city under Teschitzki. In 1888 he began a professional tour of Germany, and the following year appeared with much success in Paris. He played in London in 1890, and in 1892 made a highly successful tour in the United States. In 1893 he visited the World's Fair at Chicago, where he secured $150,000, and in 1896 made a tour in America, by which he realized $187,000. Subsequently he made other highly successful visits to the United States and played in many of the leading cities. His compositions include more than ninety works, most of which were written before he was twenty-five years of age. His productions include "Polish Fantasie;" "Song of the Voyager," and "Menuet Moderne." He donated $10,000 for the encouragement of American composers.

I. J. PADEREWSKI.

PADILLA (pä-deel'yä), **Juan Lopez de**, Spanish insurrectionary leader, born in the latter part of the 15th century at Toledo, Spain; executed April 24, 1521. He was the eldest son of the commentator of Castile, secured the military command of Saragossa from Charles V., but soon after joined the popular movement against excessive taxation, and was chosen leader by the people.

After a series of successes, his army was defeated at Vilalas, on April 23, 1521, when he was captured and beheaded. The insurrectionary forces held Toledo for some time after his death under the direction of his wife, but she was compelled to flee for safety to Portugal, and the movement was entirely suppressed.

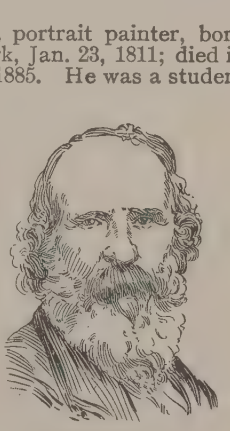
PADUA (păd'ū-a), a city of northern Italy, capital of a province of the same name, situated on a plain twenty-three miles west of Venice. The city occupies a picturesque site on the Bacchiglione River, which is crossed by a number of bridges. The streets in the older part are narrow, but in the newer portion they are platted according to modern plans, intersecting each other at right angles, and the buildings are mostly high. There are good railroad connections, a public school system, a chemical laboratory, an observatory, a museum of natural history, and a library of 125,000 volumes. The city has a number of historic buildings, among them the churches of Santa Giustina, San Giorgio, and San Antonio, a cathedral, the city buildings, and the University of Padua, an institution founded in 1221. This university has seventy professors and is attended by about 1,650 students. Among the manufactures are cotton and woolen goods, clothing, machinery, porcelain, and silk textiles. Padua ranks among the earliest cities of Italy, and in Roman times was known as Patavium. It enjoyed remarkable prosperity in the first century of the empire, when it had vast woolen manufactures. Attila destroyed the city in 452, but it again rose to vast commercial and educational importance in the Middle Ages, and was conquered successively by the Venetians, Austrians, French, and Germans. In 1866 it became a part of Italy. Population, 77,980.

PADUCAH (pa-dū'ka), a city of Kentucky, county seat of McCracken county, on the Ohio River. It has convenient railway connections with other cities, electric lights and street railways, excellent public schools and waterworks, and is the seat of a ladies' seminary. Among the manufactures are flour, carriages, ships, machinery, hardware, furniture, and tobacco products. Paducah is one of the most important tobacco markets in the United States. It has a growing trade in pork, iron, corn, lumber, and merchandise. Population, 1900, 19,446.

PAGANINI (pä-gä-nee'nee), **Nicolo**, distinguished violinist, born at Genoa, Italy, Feb. 18, 1784; died in Nice, May 27, 1840. His first musical training was given by his father, and at the age of nine years he made his appearance in public at Genoa, where he met with much success. Soon after he devoted a number of years to diligent study and practice, and in 1805 began a successful tour of Europe, in which he attained especial successes in Vienna, Berlin, and Paris. By 1828 his reputation had become extended to the whole of Europe, and in 1829 he visited Paris. Two years later he played at King's Theater, London, and soon after returned to Italy with a princely fortune, but much of it was lost in speculative enterprises. Paganini developed an impressive and passionate style, and no violinist since his time has been able to excel him. The pope decorated him with the Order of the Golden Spur in 1827, and he was honored by other personages and societies.

PAGE, Thomas Nelson, lawyer and author, born in Oakland, Virginia, April 23, 1853. He studied at Washington and Lee University, and received a degree in law from the University of Virginia in 1874, and soon after began to practice in Richmond. Washington and Lee University conferred a degree upon him in 1887. Much of his literary work is in the familiar southern dialect, and includes "In Ole Virginny;" "Befo' de War;" "Unc' Edinburg;" "Pastime Stories:" "Among the Camps;" "Two Little Confederates;" "Old South," and "Elsket and Other Stories."

PAGE, William, portrait painter, born in Albany, New York, Jan. 23, 1811; died in Tottenville, Oct. 1, 1885. He was a student of painting under Samuel F. B. Morse, later took a course at the National Academy of Design, and pursued theological studies for two years at Andover and Amherst. It was his desire to engage in ministerial work, but later he took a greater liking to painting, for which purpose he settled in New York. Likenesses of William L. Marcy, John Quincy Adams, Browning, Beecher, and others were among his first noteworthy productions. He was elected a member of the National Academy in 1836, and in 1849 went to Europe, where he remained eleven years. Most of his time during that period was spent at Florence and Rome in studying the works of eminent masters, and on his return to America he delivered a series of lectures at the National Academy of Design. Several of his paintings are in Faneuil Hall, Boston, and one of Farragut, showing that hero in command of the naval forces at Mobile, was presented to the czar of Russia in 1871. His principal works include "Infancy of Henry IV.;" "Holy Family;" "Farragut's Triumphant Entry into Mobile;" "Antique Timbrel-Player;" "Moses and Aaron on Mt. Horeb;" "Flight into Egypt;" "Shakespeare, from the German Death-Mask," and "Venus."



WILLIAM PAGE.

PAGET (păj'ęt), **Sir James, Baronet**,

noted surgeon, born in Yarmouth, England, Jan. 11, 1814; died Dec. 30, 1899. He studied at St. Bartholomew's Hospital, London, where he received a degree in medicine. In 1863 he became surgeon to the prince of Wales, and in 1877 was made sergeant-surgeon to Queen Victoria. He was vice-chancellor of London University from 1884 to 1895. In recognition of his many valuable discoveries in surgery he was created a baronet in 1871, and granted degrees by a number of important educational institutions. He served for some time as commissioner to inquire into the condition of London hospitals, and received distinguished honors at the jubilee commemorating the founding of the University of Wurzburg, Germany. Many scientific societies extended recognition to him, among them the Academy of Sciences of France. He contributed to the Royal Society. His best known writings include "Results of the Use of the Microscope;" "Lectures on Surgical Pathology;" "Clinical Lectures," and "Records of Harvey."

PAINE, Robert Treat, statesman and signer of the Declaration of Independence, born in Boston, Mass., March 11, 1731; died there May 11, 1814. He graduated at Harvard University in 1749, and after taking a theological course became a minister. Later he studied for the bar and was admitted to practice law in 1759. He first attracted general attention by prosecuting a British officer for participating in the Boston massacre of 1770, and in 1773 was elected a member of the Massachusetts assembly. In 1774 he was elected to the continental congress, in which he served till 1778, and, after the formation of the United States government, served as attorney-general of Massachusetts from 1780 to 1790. He was judge of the supreme court of the state in 1790-1804, and became the founder of the American Academy of Arts and Sciences.

PAINE, Thomas, author and statesman, born in Norfolk, England, Jan. 29, 1737; died in New York City, June 8, 1809. He was the son of a stay-maker, under whom he learned that art, but later became attached to a government custom-house, and afterward had charge of a tobacco manufactory. He was from nature a devoted republican, giving much attention to the study of political questions. In 1774 he came to the United States, and edited for a time the "Pennsylvania Magazine" at Philadelphia. In 1776 he published a pamphlet entitled "Common Sense," in which he maintained the cause of the colonies against England, and a year later published his "Crisis." These publications won him the friendship of Franklin, Washington, and other leaders, and congress rewarded him by appointing him secretary of the committee of foreign affairs. It is thought commonly that these two works of Paine were the means of consolidating the army in favor of independence, and, when a committee of loyalists had been appointed to make a reply to them, it dissolved on the grounds that it regarded the propositions advanced as unanswerable. The first words of the "Crisis" are "These are the times that try men's souls," and they became a battle-cry of the patriots.

THOMAS PAINE.

In 1779 Paine became clerk of the Pennsylvania legislature, and congress, in 1785, granted him the New Rochelle farm and $3,000 in cash. He returned to England in 1787, where he published, in 1791, his celebrated "Rights of Man," the most famous answer written to Burke's "Reflections on the Revolution in France," but it compelled him to flee to France for safety. There he was treated with the greatest respect and elected to the national convention, where he favored Louis XVI., who was then on trial. This course offended Robespierre, and he was confined in prison eleven months, escaping the guillotine only by accident. While in prison he wrote a portion of the "Age of Reason," the first part of it having been completed before his confinement, and the whole was published in 1784. This work treats largely of revealed religion, the author holding that Christianity is not the true religion, and by its publication he forfeited the friendship of many former associates in America and Europe. In 1802 he returned to the United States, and the remainder of his life was spent in the study of mechanical inventions and political questions in New York City.

PAINTING, the art of covering surfaces with pigments or variously colored substances for preservation or decoration, or with the view of representing objects in nature on a surface. As one of the fine arts, painting has for its aim the artistic representation of ideal objects or scenes, or of ideas. A mastery of this art involves a knowledge of form, design, perspective, color, and light and shade. There are three methods: drawing, including pencil, crayon, charcoal, pastel, and water color work; oil painting, embracing work on canvas or panel; and mural painting, including the technical processes of fresco, distemper, and encaustic. Other varieties embrace porcelain, vase, glass, terra cotta, and enamel painting. The majority of pantings are executed with oil, but there are such exceptions as distemper, which is done with an aqueous medium; encaustic, with a wax medium; and glass and enamel, with an essential oil. Oil colors include all those

(Opp. 1350) THE HORSE FAIR.—Painting by Rosa Bonheur.

which are obtained by grinding colors with oil, and water colors embrace those in which glycerine and gum are utilized. Painting is designated in accordance with the subject represented, as decorative, portrait, landscape, marine, historical, genre, fruit and flower, battle, architectural, and miniature painting.

Painting dates from remote antiquity. Ruins dating from the 18th century B. C. indicate that paintings and sculptures decorated the walls and temples at Thebes, and the prophet Ezekiel mentions the Babylonian and Chaldæan styles of painting adopted in Jerusalem before 598 B. C. These ancient productions were of great beauty and durability, but were largely in the form of decorations on rolls of papyrus. In many regions they were employed to decorate the walls of temples and tombs, mummy-cases, and various public buildings. Greece was the most eminently developed in painting among the ancient nations. The most celebrated Greek schools of art were at Athens, Corinth, Rhodes, and Sycyon, and their most celebrated masters include Polygnotus, Cimon, Timanthes, and Pancœnus, who lived about 400 years before the Christian era. Artistic painting was carried from Greece to Rome, where, according to Pliny, it was introduced about 650 B. C. from Corinth. However, Rome developed no great painters, the work there being executed largely by Greek artists, though there are many specimens of art that were produced by Etruscan and Byzantine masters. Italian painting developed some time after the conquest of Constantinople by the Latins in 1204, and it was later taken to Germany, France, and Bohemia.

Oil painting was introduced at the beginning of the 15th century, and led to a better development of expression and brought forward masters in many of the European countries. They developed remarkable qualities for invention, elegance in color, and grace in imparting individuality of character. Leonardo da Vinci was among the early artists to develop deep shadows and enlarge upon indoor effects; Rembrandt employed extreme contrasts of light and shade; Jan Van Eyck turned attention to brilliancy and transparency of coloring; Michael Angelo surpassed all other artists of his time in grandeur of design; Guido aroused interest in elevated landscape painting; and others developed skill in a largely diversified field of painting, most of whom are treated in special articles of this work. The success of researches into ancient remains has centered the works of great artists in museums, where they may be studied with helpful effect, while the vast exhibits of the present century call attention to the work of recent and living artists, thus giving students an opportunity to study the productions of all schools.

PAISLEY (pāz'lĭ), a manufacturing city of Scotland, on the White Cart River, about seven miles southwest of Glasgow, with which it is connected by railways. It has a number of fine streets, which intersect each other at right angles. Among its principal buildings are the Abbey Church, a number of county buildings, Neilson Educational Institution, the school of design, and the grammar school founded by James VI. It contains a free public library and museum, a number of parks, modern municipal facilities, and several fine monuments. Among the manufactures are carpets, embroidery, soap, flour, starch, chemicals, ships, machinery, spirituous liquors, cotton and woolen goods, silk textiles, and tartan cloths. The city was founded about 1163, and in 1307 was captured by the English, who burned most of it. Paisley became a free town in 1488. The building of railways and canal improvements have added greatly to its prosperity. Population, 70,125.

PAKENHAM (păk'ẹn-ạm), **Sir Edward**, British soldier, born at Pakenham Hall, Ireland, March 19, 1778; killed in battle, Jan. 8, 1815. He was a brother-in-law of the duke of Wellington, entered the British army in 1794, and served in the Peninsular War. In 1814 he was given command of the British forces stationed at New Orleans, where he was opposed by Gen. Andrew Jackson, who defeated him at that city on Jan. 8, 1815. Pakenham was among the slain.

PALACKY (pä-läts'kee), **Frantisek**, philologist and historian, born at Hodslavitz, Bohemia, June 14, 1798; died in Prague, June 26, 1876. He studied at Pressburg and Vienna, devoting himself principally to philology and history, and in 1831 was appointed the compiler of Bohemian history. To further this work he consulted the libraries and archives of Bohemia, Germany, and Italy, and in 1836 published five volumes of "The History of Bohemia." In 1848 he was identified with the extensive political agitation, and in that year led the Slavs in opposition to the German party at the diet of Kremsier. He was elected to the Austrian house of lords in 1861, but declined the position on account of being opposed to the reorganization of Austria on a Germanic basis. His later publications include the "Political Testament" and a treatise on æsthetics.

PALATINATE (păl-lăt'ĭn-āte), in German Pfalz, the name of two states of the Old German Empire. They were known as Upper and Lower Palatinate. Amberg was the capital of Upper Palatinate and Mannheim of Lower Palatinate, but the two districts were united into one government about 1620. The princes governing these possessions were long counted with the most powerful of the German Empire. In 1648 the peace of Westphalia again separated the two states by giving the Upper to Bavaria, while the Lower was made an electorate of

the empire, and was long held by Frederick III. and his successors. The treaty of Paris in 1814 gave the greater part of Lower Palatinate to Bavaria, and a portion to Prussia and Hesse-Darmstadt. Other minor changes were made by the Paris treaty of 1815. At present a portion of the region is detached from Bavaria and called Rhenish Bavaria, and the remainder is classed with Bavaria proper.

PALATINE HILL. See **Rome.**

PALAWAN (pä-lä-wän′), or **Paragua,** an island of the Philippines, situated east of the China Sea, west of Negros and Panay, and north of Borneo. It has an area of 7,575 square miles and ranks as the third in size of the islands in the Philippine Archipelago. Its surface is largely mountainous, but there are extensive valleys and coast regions of fertility, and the mountain slopes are well timbered. Tobacco, rice, palms, live-stock, cereals, and fruits are grown in abundance. The climate is quite moist and somewhat unhealthful. Lead, iron, copper, antimony, and granite are among the minerals. Puerto Princesa and Taytay are its chief towns. The natives are peaceful. They include only a small number of Christians. Population, 1901, 30,000.

PALERMO (pa-lĕr′mō), one of the principal cities of Italy, situated on the north shore of the Island of Sicily, on the Gulf of Palermo. The city was the capital of the former dominion of Sicily, and is now the seat of a province of the same name and the capital of the island of Sicily. It is situated on a beautiful site, is connected by railways with the important towns of the island, and has a number of excellent public buildings. Among these are a Gothic cathedral dating from the 10th century, which contains a number of statues and the monuments of Emperor Frederick II., and of King Roger, the founder of the Norman monarchy in the island; the churches of St. Peter and St. Dominic, and the Palermo University. There are extensive public libraries and gardens, the national museum, three theaters, an archbishop's palace, and colleges of medicine, arts and sciences, and industry. The harbor is commodious and is protected by a battery and a lighthouse. Among the manufactures are cotton textiles, silk and woolen goods, boots and shoes, glass, oilcloth, wine, sailing vessels, oils, machinery, chemicals, and musical instruments.

Palermo has a large trade in manufactures, fruits, perfumery, wine, silk textiles, and earthenware. It is the seat of an extensive arsenal and has large fishing interests, the latter employing about 40,000 persons. Many modern improvements have been introduced, including telephones, electric and gas lights, and a fine system of street railways. It is thought that Palermo was founded by the Phœnicians, and was known to them as Panormus, and when Sicily was a possession of Carthage it became the capital. The Romans conquered it in 254 B. C., the Vandals in 440 A. D., and the Normans in 1072. Subsequently it was held by the German emperors, and since 1282 its history is identified quite closely with the kingdom of Sicily. Revolts against the kings of Naples occurred at various times. They made it their residence from 1806 to 1815, but through the activity of Garibaldi it became free in 1860. Its prosperity in modern times is due largely to its vast commercial trade, fisheries, and manufactures. Population, 317,615.

PALESTINE (păl′ĕs-tīn), a city in Texas, county seat of Anderson county, 180 miles northeast of Austin. It is conveniently connected with other cities by railways, giving it considerable trade advantages. The surrounding country produces vast quantities of live-stock, cereals, cotton, and fruits. Its improvements include electric lights, pavements, waterworks, and good schools. Among the manufactures are cotton-seed oil, flour, cigars, pottery, machinery, metal products, and utensils. It has a fine county courthouse and other public buildings. Population, 1900, 8,297.

PALESTINE, the Holy Land, or Canaan, a region of Asiatic Turkey, situated on the eastern shore of the Mediterranean Sea, and comprising the southern part of Syria. Its extent from north to south is about 145 miles, width eighty miles, and area 12,000 square miles. The coast line is quite uniform, the principal indentation being the Bay of Acre, and the principal projection into the sea is Cape Carmel. It has an abundance of drainage toward the west into the Mediterranean Sea, and toward the east and south into the Dead Sea, though the Jordan is the principal river. Other streams of note embrace the Leontes, Kishon, Kanah, Brook Sorek, Gadara, and Jabbok. There are three lakes of note, including Lake Merom in the north; the Sea of Galilee, a body of water 682 feet below the Mediterranean, and the Dead Sea, a sheet of water 1,317 feet below the Mediterranean.

The central portion of Palestine is a tableland with a mean height of about 1,600 feet. In the east is the depressed valley of the Jordan extending from north to south, and along the coast are the Maritime plains and the plains of Jericho and Esdraelon. The descent from the central plateau to the Dead Sea and the Jordan is rugged and precipitous, but toward the west it is more gradual, though there is a hilly region toward the Maritime plains, also called the plains of Philistia and Sharon. The principal elevations include Jebel Jermuk, 3,935 feet; Hebron, 3,030 feet; Mount of Olives, 2,725 feet; Mount Tabor, 1,900 feet, and Mount Gerizim, 2,700 feet. The general elevation at Jerusalem is 2,610 feet. Minerals of value are found in the mountain regions, including principally ironstone, rock-salt, sulphur,

and asphaltum. The Jordan River and the Sea of Galilee supply an abundance of fish. Among the wild animals are the wolf, hyena, porcupine, jackal, boar, and bear, most of which are common to the mountain regions, while numerous species of birds, such as ravens, hawks, eagles, storks, vultures, nightingales, and sparrows, are abundant.

The trees native to Palestine include the walnut, oleander, olive, cedar, sycamore, palm, ash, fig, elder, pine, and carob. Fruits are cultivated in abundance, among the varieties being the orange, apricot, almond, lime, pear, quince, apple, plum, and grapes. The principal cereals include barley, wheat, rice, and maize, and there is a considerable production of sugar-cane, tea, potatoes, and garden vegetables. Silk culture is a growing industry. Besides the domestic animals common to Europe, there are large interests devoted to rearing the camel, ass, mule, and goat. The manufactures embrace wine, olive oil, ornaments, jewelry, clothing, utensils, and food products. Summer and winter make the two seasons of the year, the former extending from April to November, when rainfall is limited, but during the remainder of the year there is an abundance of moisture. The ground is rarely frozen except in the mountains, and much of the surface is fertile.

Palestine was inhabited by six nations when the children of Israel invaded it after sojourning forty years in the desert. These nations were the Ammonites, Canaanites, Hittites, Perizzites, Hivites, and Jebusites. At that time allotments were made to the different Hebrew tribes, though the war for possession continued at varying intervals. The government continued to be tribal with marked distinctions until the rise of the Judges, and later David made Jerusalem his capital. In the meantime the cities of ancient renown rose and fell at various periods, and at present there are scarcely any evidences of the cities later called Diospolis, Cæsarea, and Antipatris. The Israelites were carried off in captivity by the Babylonians, and, when they returned, the industries again developed, though the Philistines continued to possess a part of the country. At the birth of Christ Palestine was a Roman possession. It was made up of the four provinces of Judæa, Galilee, Perea, and Samaria, and Roman possession augured for its material prosperity. However, the measures adopted for its government by Vespasian caused a decline in the material welfare, and when Titus invaded the region the temple was destroyed.

Christianity developed with considerable rapidity in the time of Constantine, when the Church of the Holy Sepulcher was built, but in 606 the Saracens under Omar were severe in endeavoring to destroy its further spread. Soon after the Crusaders began to rally to the defense of Christianity, and the contests that followed are among the most memorable in the world, but the legions of Mohammedans that poured into the contest for the defense of Moslem occupation prevailed. It was governed for many years by the sultan of Egypt, but in 1517 the Turks made it a part of their dominion. Several railroad lines were built in the last century, and explorations for antiquities began to develop about 1870, when the American Palestine Exploration Society was formed. Since then valuable data have been secured by organizations from many countries, giving rise to an accumulative fund of geographical, historical, geological, and topographical knowledge of the region. It is a center of interest for Christians, Jews, and Mohammedans, since it is the cradle of their religious systems. Many different classes of residents populate the region. The prevailing language is Arabian. Its total population is estimated at 710,500.

PALESTRINA (pä-lĕs-tree'nä), **Giovanni Pierluigi da**, eminent musical composer, born in Palestrina, Italy, in 1524; died Feb. 2, 1594. In 1540 he went to Rome to study music under Claude Goudimel. There he became a musical director under an appointment of Pope Julius III. in the Julian Chapel of St. Peter. He published a collection of masses in 1554, and the following year became a singer in the Sistine Chapel. When the pontificate became vested in Paul IV., Palestrina lost the position, for the reason that the former held celibacy a necessary qualification, but in 1555 he became choir master of St. Maria Maggiore, and in 1571 was restored at St. Peter's. His compositions are remarkable, and include a number of celebrated masses, among them the "Mass of Pope Marcellus." Palestrina may be regarded the first composer to conform musical science to musical art, and his productions are very voluminous, including six books of "Motets;" thirteen books of "Masses;" three books of "Madrigals," and a number of books of hymns, lamentations, and litanies.

PALIMPSEST (păl'ĭmp-sĕst), an ancient parchment or other writing material written upon twice, the original writing having been erased to fit it for a subsequent record. The fact that such parchments were produced may be attributed to the Saracen conquest of Egypt, on account of which the supply of writing material became limited, and the consequent exaggerated price made it necessary for many of the Greeks and Romans to scrape or wash materials formerly used for writing purposes, and thus render them capable of being utilized a second time. The erasure was made either with pumice stone and an edged implement, or by washing with a sponge, but in most cases the erasure was imperfect owing to the fact that inks had been used which could not be easily removed. Many of the palimpsest parch-

ments have been of double value, since the newer writing has been used, and the older has in many cases been restored by the use of chemical reagents. Restoration is possible by infusion of gall, acids, or oil, these substances acting upon certain traces of the material of ink remaining in the parchment. Among the writings restored in this way are large fragments of the "Iliad" of Homer; the "Republic" of Cicero; "Institutes" of Caius; "Origines" of Isidorus, and portions of the histories of Siculus, Diodorus, Polybius, Appian, and Dionysius of Halicarnassus. Among the most successful students of these documents are Niebuhr and Cardinal Angelo Mai (1782-1854).

PALISSY (pä-le-sē'), **Bernard**, potter and painter, born in Agen, France, in 1509; died in Paris, in 1590. He first studied as a glass and portrait painter, but later devoted much attention to the study of producing fine pottery, having become interested in that art by working as an apprentice to an Italian potter. Palissy became a devoted Protestant, for which he was imprisoned at Bordeaux. Later he was liberated and made potter to the king of France, and was saved from the massacre of St. Bartholomew by Catharine de Medici. His principal works in Paris were on the grounds now occupied by the Tuileries, the name meaning tile-kiln, and was derived from his tile works. He lectured on physics and natural history for a period of about ten years, beginning in 1575, but the persecutions then directed against the Huguenots caused him to be imprisoned in 1585 in the Bastille, where his death occurred. Many specimens of his art are preserved in the museums of France, especially at the Louvre, in Paris.

PALLAS. See **Minerva.**

PALLAS, a small planet that has a position between Mars and Jupiter, and which was discovered at Bremen by Olbers (q. v.) in 1802. Its orbit is inclined to the ecliptic more than that of any other planet. The revolution around the sun occurs in 4.61 years, and its diameter is estimated at 300 miles. It was so named from Peter Simon Pallas, an eminent traveler and naturalist, who was born at Berlin, Germany, Sept. 22, 1741; died there Sept. 8, 1811.

PALMA (päl'mä), a city of Spain, on the southeastern coast of the island of Majorca, on Palma Bay, 132 miles south of Barcelona. The city is pleasantly situated, has a fine harbor, and is connected by railway with the principal trade centers of the island. Among the manufactures are cordage, woolen and silk goods, clothing, machinery, and utensils. Many of the buildings are of the Moorish style of architecture, and most of its streets are regularly platted, intersecting each other at right angles. It contains a Gothic cathedral, an exchange, a governor's palace, three colleges, and a number of fine educational institutions. The city has a fine public library, a museum, several parks, and a number of modern municipal improvements. It has an extensive foreign and domestic trade. Population, 61,790.

PALMAS, a cape on the west coast of Africa, forming the southern extremity of Liberia. It has a substantial lighthouse.

PALMER (päm'ẹr), a town of Hampden county, Massachusetts, fifteen miles northeast of Springfield, on the Quaboag River. It has a number of railroads and electric car lines. Among the manufactures are wire, yarn, tickings, duck and flannel, woolen goods, and machinery. The surrounding country is agricultural, producing cereals, fruits, and dairy products. Palmer has waterworks, electric lights, and other municipal improvements. It has a growing trade in merchandise. Population, 1900, 7,801.

PALMER, Alice Freeman, teacher, born in Colesville, New York, Feb. 21, 1855. She graduated from the University of Michigan in 1876, became teacher of Latin and Greek at Lake Geneva, Wisconsin, and in 1879 was made professor of history in Wellesley College. Of this institution she became acting president in 1881, and the following year was chosen its president, serving in that capacity until 1887, when she resigned and married George H. Palmer, professor at Harvard University. In 1882 the University of Michigan honored her by a degree, and in 1887 Columbia University did likewise.

PALMER, Erastus Dow, sculptor, born in Pompey, New York, April 2, 1817. He first learned the trade of a carpenter, and then engaged as a cutter of cameos, but in 1852 began to engage in sculpture. He visited Italy and France in 1872, and in that year executed at Paris a statue of Robert R. Livingston, now in the hall of representatives at Washington. This work and several others were exhibited at the Centennial Exposition in 1876. Other works include "The White Captive;" "Indian Captive;" "Landing of the Pilgrims;" "Infant Flora;" "Morning," "Evening," and busts of Hamilton, Irving, Perry, and other Americans. "The Angel at the Sepulchre," a large statue in the cemetery at Albany, New York, is counted one of his best works.

PALMER, John McAuley, statesman, born in Scott county, Kentucky, Sept. 13, 1817; died Sept. 25, 1900. His education was secured in the public schools, after which he studied law, and in 1840 was admitted to the bar of Illinois. He became state senator in 1852, and in 1860 was a republican presidential elector. At the beginning of the war he entered the service as colonel, and commanded at New Madrid, Island No. 10, Farmington, and Stone River. He was governor of Illinois from 1869 to 1873. Later he went over to the democrats, and in 1891 was elected United States senator. In 1896 he was the candidate for president of the national democratic party, a

division that was unfavorable to bimetallism, but he failed to carry any of the states. He received 133,148 of the popular votes.

PALMER, Ray, clergyman and author, born in Little Compton, Rhode Island, Nov. 12, 1808; died in Newark, New Jersey, March 29, 1887. In 1830 he graduated from Yale University, was licensed as Congregational minister in 1832, and received a charge at Bath, Maine. He remained in that city until 1850, when he was appointed pastor in Albany, New York. Union College conferred a degree upon him in 1852, and in 1866 he became secretary of the Congregational Union in New York City, a position he held twelve years. Among his writings are the "Unlost Paradise;" "Earnest Words;" "Closet Hours," and "Holy Communion." His many beautiful hymns include "My Faith Looks Up to Thee," which has been translated into numerous languages.

PALMERSTON (päm'ẹr-stọn), **Henry John Temple, Viscount**, British statesman, born in Westminster, England, Oct. 20, 1784; died Oct. 18, 1865. He descended from a noble family, who claimed descent from Edwyn, an important personage who lost his life in 1071 by opposing the Normans. Palmerston was educated at the University of Edinburgh, and in 1803 graduated from Cambridge. He was elected to parliament from the Isle of Wight in 1807, when he was made one of the junior lords of the admiralty. Cambridge elected him to parliament in 1811, and he held his seat until 1828, retiring at that time from the Wellington ministry on account of supporting Catholic emancipation. Later he was elected for several other districts, held the office of foreign secretary until 1841, and in 1846 became foreign minister. His policy met with marked opposition in the house of lords, where a resolution of censure was introduced in 1850, but the house of commons passed a vote of confidence, though not until after four days had been spent in debating that measure. In 1852 he became home secretary, was made prime minister in 1855, and his ministry fell in 1858 on the question of approving the course pursued by the emperor of France in relation to the refugees who had plotted against Napoleon. He returned to power in 1859 and remained the prime minister until his death. It was his ambition to extend everywhere the influence of British power. During his public life occurred the Civil War in America, the war between France and Austria, the revolutionary movement of 1848, the Greek imbroglio of 1847-50, and the war between Austria and Prussia. His remains were buried in Westminster Abbey. His views are set forth in various addresses and in the parliamentary reports.

PALMETTO (păl-met'tō), a species of palm indigenous to the United States. It is found abundantly in the Carolinas, Florida, Georgia, and some sections of California. There are a number of allied species, some of which are widely distributed in Eurasia and various islands of the sea. The stem in all varieties is rough with the

PALMETTO.

bases of the old leaf-stalk usually thickened upward. It attains a height of from thirty to fifty feet. The leaves are from six to ten feet long, and are terminal from a single bud. Palmetto wood is very durable under water. It is not attacked by ship worm, and serves a valuable purpose for piles and wharves. The leaves are woven into hats, and the buds of some species are eaten as a vegetable.

PALMISTRY (păl'mĭs-trў), the art by which some profess to be able to read the character and temperament of others, and to discover past events and make predictions as to the future. This practice is based upon the lines and marks of the palm of the hand, usually the left, and some professing ability take into account the shape of the hand. Palmistry was regarded a science worthy of approbation by Aristotle, and was practiced by Emperor Augustus of Rome. Various records of the Brahmans in India prove that it is of great antiquity. A Brahman caste called Joshi makes use of certain marks and features of the face and body in connection with those of the palm of the hand, and in a manual of palmistry published many centuries ago the art is fully outlined by illustrations and descriptions.

Among the prominent features of the palm on which the interpretation is based is

included a curve from the basal joint of the forefinger round the thumb as far as the wrist joint, called the line of life, and when this is deeply colored and variously marked by connected furrows it is said to indicate a long and happy life. Fortune is indicated by a clear and unbroken line from the forefinger to the little finger, called the line of fortune; and the state of health is estimated by a line running across the hand, called the line of health. The prominent characteristics indicating traits of character include the fleshy projection at the base of the forefinger, called the mountain of Jupiter; at the base of the thumb, the mountain of Venus; of the middle finger, the mountain of Saturn; of the ring finger, the mountain of the sun; and of the little finger, the mountain of Mercury. In like manner certain marks or eminences indicate other heavenly bodies, and with each of these are associated the qualities common to the respective planets, which are said to be possessed by the individual. The mountains may be modified in their signification by other signs or lines, but they are said to indicate various traits.

Jupiter, when well developed, indicates ambition and pride; Venus, melody and love; Saturn, fatality; the sun, riches; and Mercury, science and wit. Those professing a knowledge of and belief in palmistry have striven to make it an exact science by detailing with claims of exactness every mark and indication of prominence, but the art has been consigned to obscurity by practically all students of educational and scientific arts.

PALMS (pämz), an order of endogenous trees, occurring principally in tropical countries. They are characterized by tall and

PALM.

slender stems, which gradually diminish in size upward. Some of the species are of low growth, though most of them attain to a great height, often from 150 to 190 feet. The stem is without branches and at the top is a crown of large leaves. The largest leaves are borne by the fan-leafed palm, and the pinnate leaves of some species often measure thirty feet in length and from three to eight feet in width. Stems measuring from three to five feet in diameter are not rare. Humboldt placed the number of species at 600, and asserted that not a single species is found in which some good property does not exist.

Among the various products of value derived from palms is the food secured from the stems when young. The cabbage palm yields an edible terminal bud, and the cocoa, date, and other varieties supply valuable fruit. A variety known as sugar palm yields a brown sugar, and from the sap a beverage is made. The sago palm is the source of the sago of commerce; the wax

COCOANUT PALM. OIL PALM.

palm exudes a juice from which wax is made; and the fan palm is valued for its foliage, which serves in the manufacture of fans and other useful articles. The wood of many varieties is valuable for its strength, and the bark serves in making cordage. Palm trees are found in abundance in South America, the West Indies, the East Indies, and the tropical regions of Asia and Africa. The fruit of many varieties is acrid, and some species yield a kernel from which vegetable ivory is prepared, resembling somewhat the coquilla nut.

PALM SUNDAY, the Sunday before Easter, being the last Sunday in Lent and the first in Holy Week. It was so named in commemoration of Christ's entry into Jerusalem, when palm branches were strewn before him. The feast of palms was observed in the East as early as the 5th century, and later it became an occurrence of the Roman and Greek Catholic churches. It is the practice in these churches for the priest to bless the palm branches carried by worshipers, and as they pass out festival hymns are sung. When the participants return home, the branches are preserved and their ashes are used in celebrating Ash Wednesday.

PALMYRA (păl-mī'ra), a city of ancient Syria, located 145 miles northeast of Damascus, where its ruins are still to be seen in an oasis. Solomon is thought to have founded the city in the 10th century B. C., and in his time it became an important stronghold

of the Hebrew kingdom. The immediate vicinity of the city consists of a fertile and well watered tract of land abounding in palm trees, but surrounding it at a distance are either sandy tracts or barren mountains. It continued to develop importance for centuries, and in the early part of the 3d century A. D. became the center of an empire under Odenathus, which included both Syria and Mesopotamia. Emperor Aurelian, of Rome, conquered it in 275, and the Saracens destroyed it in 744, but its ruin was completed by Tamerlane in 1400. The site is at present occupied by an Arabian village called Tedmor. Many interesting ruins have been found there by modern explorers, among them the remains of a temple of Baal, a number of valuable monuments, and numerous relics bearing inscriptions in the Aramaic language. There are also many Corinthian columns and tomb towers. The latter date from a period immediately preceding the Roman conquest, and have inscriptions in the Syriac.

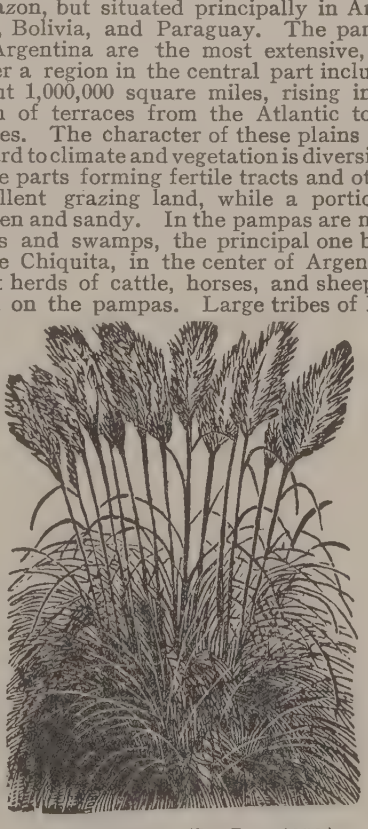
PALO ALTO (pä'lō ăl'tō), a town in Santa Clara county, California, situated thirty-two miles southeast of San Francisco. It is conveniently connected with western cities by railways. The surrounding country is agricultural and fruit-growing, yielding large quantities of cereals, fruits, and grasses. The town is noted chiefly as the seat of the Leland Stanford, Jr., University. This institution is one of the many excellent establishments devoted to higher learning in America, and was founded by Leland Stanford in memory of his son. The town of Palo Alto has a site in every way fitted for such an institution, and contains many fine hotels, churches, and residences. Population, 1900, 1,658. See **Leland Stanford, Jr., University.**

PALO ALTO, a Spanish term meaning tall timber, and the name applied to the first important battle of the Mexican War, which occurred in the forests about eight miles northeast of Matamoros, on May 8, 1846. The Americans under General Taylor numbered 2,300, and the Mexicans under General Arista about 6,000. This battle covered a period of five hours and the Mexicans were defeated, but they retreated in fairly good order. The Americans lost four killed and forty wounded, and the Mexican loss in killed was about one hundred.

PAMIR (pä-mēr'), an elevated mountain region of Asia, situated principally in the southern part of Turkestan, and formed by a union of the extremities of the Himalaya, Hindu-Kush, and Thian Shan Mountains. The region includes 30,000 square miles. It has a general altitude of 13,000 feet above sea-level, its elevation giving it renown as the "roof of the world." The region has great extremes of heat and cold, with a rainfall barely sufficient to produce vegetation for the herds of cattle and sheep pastured there by the Kirghis herders. Animal and bird life is quite abundant, and caravan routes have crossed it for many centuries. Lakes Shivakul and Karakul are among the numerous small sheets of water. A number of rivers have their source in the Pamir, among them the Oxus.

PAMLICO SOUND (păm'lĭ-kō), an inlet from the Atlantic Ocean, extending a distance of seventy-five miles along the eastern coast of North Carolina, and having a width of from fifteen to twenty-five miles. It is separated from the Atlantic by a number of long and narrow islands of sand, and is connected with Albemarle Sound by Croaton Sound. The Neuse and Tar rivers flow into it. Its shores are mostly low, and it may be reached by vessels from the ocean through Hatteras and Ocracoke inlets. In many places are tracts covered by bulrushes and other aquatic plants. Bird and fish life is abundant.

PAMPAS (păm'päz), a name applied to the vast open, treeless plains in the region of South America lying south of the Amazon, but situated principally in Argentina, Bolivia, and Paraguay. The pampas of Argentina are the most extensive, and cover a region in the central part including about 1,000,000 square miles, rising in the form of terraces from the Atlantic to the Andes. The character of these plains with regard to climate and vegetation is diversified, some parts forming fertile tracts and others excellent grazing land, while a portion is barren and sandy. In the pampas are many lakes and swamps, the principal one being Lake Chiquita, in the center of Argentina. Vast herds of cattle, horses, and sheep are kept on the pampas. Large tribes of Indians and wild horses and cattle are still numerous in some sections. Many species of grasses are abundant, supplying fine pasturage, and native plants suitable for hay.



PAMPAS GRASS. (See Page 1358.)

PAMPAS GRASS, a tall, ornamental reed-like grass native to the pampas of South America, but now cultivated for ornamental purposes in many countries of America and Europe. It has long, narrow and rigid leaves, much crowded at the base, naked culms with large spikes of whitish flowers, and male and female organs on separate stalks. Usually the leaves attain a length of from three to six feet, and the flower stems are from eight to twelve feet high. The flower plumes are used for decorative purposes by florists. Several species have been described, differing mainly in the flowers, which are purple, yellow, or variegated with white.

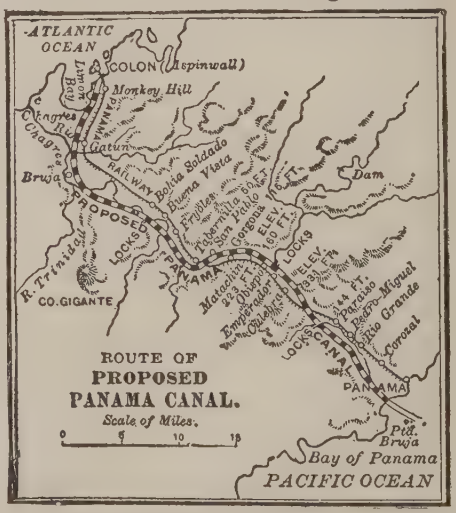
PAN, the Grecian god of fertility, who presided over all rural occupations, and was the special patron of shepherds and huntsmen. He was regarded the son of Hermes and Callisto, and at birth had small horns sprouting from his forehead, pointed ears, a goat's beard, and the tail and feet of a goat. The name of Pan was given to him because as a youth he delighted all of his associates with many antics and his peculiar and grotesque form. The Greeks looked upon him as possessing the power of prophecy and skill in music, and regarded him the inventor of the Pandean pipes, or syrinx. Milk and honey were usually offered to him in sacrificial worship, but rams, lambs, and cows were more commonly sacrificed. The Romans had a divinity called Faunus, whom they identified with the Greek Pan, and ascribed to him the gift of prophecy, protection against wolves, fertilization of the soil, and the instigation of bad dreams and evil apparitions. The satyrs were his attendants. Pan is celebrated in literature, being mentioned by Schiller, Milton, Rabelais, and Mrs. Browning.

PANA (pā'na), a city of Illinois, in Christian county, forty-two miles southeast of Springfield. The surrounding country contains productive deposits of coal and fertile soil. It has good railroad facilities. Among the manufactures are flour, cigars, tobacco products, and machinery. It has telephones, waterworks, electric lights, and several fine school and church buildings. There is a considerable trade in grain, minerals, and merchandise. Population, 1900, 5,530.

PANAMA (păn-a-mä'), a seaport city of Colombia, on the north coast of the Bay of Panama. It is connected with Aspinwall, a city on the Caribbean Sea, by railway. The houses are mostly of stone, built in the Spanish style. It is the capital of the state of Panama, has a secure harbor, and enjoys a large export and import trade. The principal buildings include a cathedral, several public schools, a college, and a number of convents. The surrounding country is devoted largely to agriculture and stock-raising, and in its vicinity shells, pearls, gold dust, and many species of fish are obtained. However, the industries are not pursued as vigorously as similar enterprises are in the United States. The prosperity of Panama dates from 1855, when its railroad connection with Aspinwall, about forty-eight miles distant, was completed. Since then a large amount of freight has been transported across the isthmus, instead of shipping by way of Cape Horn. It suffered much from disastrous fires in 1864 and 1874. Population, 31,160.

PANAMA, Isthmus of, a narrow neck of land connecting North and South America, and separating the Atlantic Ocean from the Pacific Ocean. It is from thirty to sixty-five miles wide, and the principal part of it is included in the republic of Panama, formerly a division of Colombia, which has an area of 31,570 square miles. A range of mountains traverses the isthmus, and there are many small rivers that afford excellent drainage. The climate is generally unhealthful in the lower coast regions and valleys, and quite agreeable in the highlands. Among the chief productions are iron, salt, copper, coal, and other minerals. Much of the soil is fertile, yielding wheat, rice, coffee, maize, and tropical fruits. Cattle and horses are reared in considerable numbers, and sheep culture has been instituted recently on an extensive scale. The abundant forests yield lumber, indigo, and caoutchouc. Panama became independent in 1903, with Manuel Amador as president. Population, 301,500.

PANAMA CANAL, a canal projected and partly built across the Isthmus of Panama with the view of connecting the Pacific



PANAMA CANAL.

Ocean with the Atlantic Ocean. Plans to mature this enterprise were discussed by navigators in the early part of the 15th century, since its successful consummation would be of immeasurable value in shortening the commercial route from all points on the Atlantic Ocean to the Pacific, thus avoiding the long route around the grand divi-

sion of South America. Spanish navigators projected it at the time Spain claimed all of the vast regions south of the United States and the West Indies, and the Dutch prospected with that view when the Netherlands made settlements in Guiana, but definite steps were not taken until in 1879, when M. Ferdinand de Lesseps convened an international congress at Paris to discuss the project. Previous to that plans had been made for the enterprise, and a concession for operations in Panama by the Panama Canal Company was secured soon after from Colombia.

Extensive and accurate surveys were made in 1881 and the necessary hospitals and camps were built. The following year the company purchased the Panama railway, along which line the canal was to be constructed. The estimates placed the cost at $160,000,000, but De Lesseps reduced the figures of the engineers to $120,000,000, and announced that a platted level canal could be completed for that amount. Large sums of money were borrowed to carry the enterprise forward, but by 1888 the accumulated interest became burdensome and it was impossible to secure further loans. In 1889 the company had a bonded indebtedness of $350,000,000, with an accumulation of over $20,000,000 unpaid interest, and only a fifth of the work had been done. Before the end of the year the company was forced into liquidation. A commission appointed to examine into the state of affairs reported that tides were washing the cut at Aspinwall and rapidly filling the excavations with deposits; that machinery valued at $30,000,000 was rusting away, and that the climatic conditions were such as to render the region extremely unhealthful for European laborers.

Later the government of Colombia extended the time for completing the canal ten years, provided operations should be resumed in 1893. In 1892 a sensation was sprung in the French legislature by M. Delahaye, who charged that the Panama Canal Company had been perpetrating gigantic frauds by subsidizing newspapers, bribing deputies, and securing exceptional privileges. The elder De Lesseps died on Nov. 7, 1893. His son Charles was sentenced for fraud to imprisonment, and many others were similarly punished. However, in 1894 a prominent engineer proposed a scheme to complete the canal at a cost of $110,000,000. Work was resumed, but ceased the following year on account of labor troubles. In 1903 the United States by treaty agreed to complete the canal, paying Panama $10,000,000 and the French company $40,000,000 for canal rights. Work began in 1904 under John F. Wallace, chief engineer, and its completion is assured.

PAN-AMERICAN CONGRESS, a conference of representatives from the republics of America, which convened at Washington on Oct. 2, 1889, for the purpose of formulating plans for furthering American trade and establishing an American customs union. The plan of holding a Pan-American congress was originated by Henry Clay, but nothing definite was done until James G. Blaine agitated such an enterprise. The nations entitled to representation included the republics of the United States, Mexico, Central and South America, Santo Domingo, and Haiti. An adjournment was taken immediately after convening for the purpose of visiting different sections of the United States before commencing work. The congress began its deliberations on November 19 of the same year, and continued in session for five months, adjourning April 19, 1890. Among the different recommendations for commercial reforms suggested for adoption by the various governments are included reciprocity treaties by all the countries, a uniform commercial coinage, a uniform system of weights and measures, and a general plan of legalizing documents. The projects discussed without definite recommendation include the passage of uniform laws authorizing patents and copyrights, subsidies to steamship companies, extradition treaties, and the establishment of an international bank. The Bureau of American Republics was established at the suggestion of this convention. Since then other congresses of a like nature have been suggested, and it is probable that material benefits will accrue to all American countries within the next few years.

PANDA (pan'da), a genus of carnivorous quadrupeds native to the Himalayas and northern India. They are about the size of a large cat, have a raccoon-like appearance, long, reddish-brown fur, and a long, ringed tail. The food consists of birds, large insects, and small quadrupeds, which they catch by frequenting trees, where they dwell chiefly. The fur is considered of value commercially. These animals agree in many respects with the civets, and have been classed with them by some writers. The natives call them wah, from the cry.

PANDORA (păn-dō'rà), an individual mentioned by Hesiod in Greek mythology as the first woman. It is related that she was formed out of clay by Vulcan at the request of Jupiter, who designed her for the purpose of punishing Prometheus, because the latter had stolen fire from heaven and brought it to earth. The gods immediately vied in making her presents. Mercury bestowed on her a smooth and persuasive tongue; the Graces made her fascinating; Minerva gifted her with the possession of feminine accomplishments; Aphrodite gave her beauty and the art of pleasing; and she was named Pandora because she possessed all gifts necessary to make her charming and irresistible. The gift from Jupiter was a box filled with unconquerable evils, which was intended for Prometheus, but his brother, Epimetheus, became charmed by Pandora's

beauty and accepted it as a present. On opening the box all the ills and diseases that now afflict mankind escaped. However, hope lay at the bottom, and before it could escape Pandora hastily closed the lid. It is due to her that hope is preserved to man as a never-failing solace. Though many ills confront him in every walk of life, hope springs eternal in the human breast.

PANICS (păn'ĭks), the commercial crises resulting from excessive speculative enterprises, unusual and harmful legislation in relation to finances and industries, and extensive failure of crops. A panic is attended by overpowering alarm in financial and commercial circles. In that case a sudden run commences on the banks, the prices of securities fall, and other abnormal commercial conditions ensue. Among the panics of most note in foreign countries since 1750 are the following: the panic of Holland in 1773, which was attended by failures exceeding $50,000,000; the panic of England in 1793, resulting from the French War, when the government issued $25,000,000 exchequer bills; the panic of England in 1825-6, resulting from speculations in the colonies, when 770 banks failed and many families were required to live on bran; the panic of England in 1847, owing to excessive railroad speculation, when the failures amounted to $100,000,000, and the rate of discount was 13 per cent.; and the financial crash in Australia in 1892.

The most noteworthy panics of the United States begin with that of 1819, which resulted from speculation that followed the War of 1812. In 1837 a panic was caused by a number of years of extraordinary speculation, when a large amount of business was transacted on the credit system under an inflated currency, and with an increase of population and a reduction of the volume of money per capita debtors were unable to meet their obligations. At that period state banks were also established, from which currency was issued that later depreciated in value, which afterward became known as wild-cat money, and the mode of doing business was called wild-cat banking. The panic of 1873 resulted from another period of inflation of the currency during the Civil War and from legislation partially destroying the monetary functions of silver. In 1893 a widespread panic occurred, in which strikes, runs on banks, and other business disturbances were common. This panic is generally assigned to a variety of causes, including poor crops, unsound financial legislation, and the unwholesome effect on our markets of a large production of crops in foreign countries.

PANSY. See **Violet.**

PANTHEISM (păn'thē-ĭz'm), a form of religious philosophy that holds God and the universe to be identical, and which regards mind and matter as the manifestations of one universal being. It assumes the identity of cause and effect, and a conception of the Deity is obtained by reasoning in relation to the individual and the objects that surround him. Pantheism had many adherents among the philosophers of Greece, among them Anaximander, Pythagoras, and Xenophanes. It is still widely accepted by many of the educated Brahmans, and enters largely into the religious thought of Egypt, Persia, Hindustan, and other countries, in all of which religious systems prevail that partake of pantheistic forms. Spinoza is the most noted modern representative of this dogma, and his writings, though largely misunderstood, give marked evidences that he held to many of the main tenets of pantheism.

PANTHEON (păn'thē-ŏn), a name applied to several important temples dedicated to the purposes of religious worship, as the Pantheon at Rome and the Pantheon in Paris. The Pantheon at Rome was built by Agrippa, son-in-law of Augustus, about 27 B. C., and was dedicated to Mars in memory of the victory obtained by Augustus over Antony and Cleopatra. Emperor Phocas gave it to Pope Boniface IV. in 609 A. D., who dedicated it to the virgin and holy martyrs, and Gregory IV. dedicated it to all the saints in 830. This structure has a circular form, is 188 feet in diameter, 212 feet high, and has a dome extending thirty-six feet above the upper cornice. It is now known as the Church of Santa Maria Rotonda, and within its walls many famous men have been buried. The Pantheon in Paris dates from 1761. It is a most beautiful structure, and for some time has been known as the Church of St. Genevieve. In it are buried many men of eminence, among them Voltaire, Lagrange, Lannes, and Rousseau.

PANTHER (păn'thĕr), an animal of the leopard family, but exceeding the leopard in strength and size. The body is nearly six feet long without the tail, and the height at the shoulder is three feet. Its color is yellow, with a number of rings and spots on the sides. Like the leopard, it is a carnivorous mammal, feeding on birds and small quadrupeds. The puma of America is known as a panther, and the cougar of North America and the jaguar of South America are designated as such by some writers.

PAOLI (pow'lee), **Pascal de**, a patriot of Corsica, born near Morosaglia, in Corsica, in 1726; died near London, England, Feb. 5, 1807. He received a liberal education at Naples, where he was taken by his father in 1739 after an unsuccessful insurrection of the Corsicans against the Genoese. Later he returned to Corsica, where he was chosen leader of the revolutionary forces in 1755, but when success was about to be secured under his able leadership, the Genoese sold the island to France, in 1768. He continued to lead the movement for independence against France, but was compelled to yield, and for safety settled in England, where he was supported by a pension. The revolu-

tionary party of France recalled him to Corsica in 1789, when he became lieutenant-general, but in 1792 he conceived the plan of making Corsica an independent republic. This course alienated the Bonaparte family, but he formed an alliance with Britain, and in 1794 surrendered the island to George III. Two years later he was compelled to leave the island by the displeasure manifested by his countrymen on this account, and in 1796 he took up his residence near London, where he was supported by a pension under the British.

PAPAW (pâ-pạ′), a tree native to tropical America, allied to the passion flower family, and now extensively cultivated in tropical countries. It has a remarkably tapering stem crowned by a tuft of leaves on long footstalks, with the flowers below, and grows to a height of from fifteen to twenty feet. Its wood is soft and of little value in manufacture, but its fruit, consisting of a dingy orange-colored product about the size of a small melon, is eaten raw, cooked, or pickled. The rind of the fruit is thick and fleshy, and its rather tender skin is yellow when quite ripe. The fleshy part is soft and sweeter than that of the banana, and in it are two rows of large flat seeds. Medical properties are obtained from the fruit and rind, while the juice of the leaves and fruit is used in rendering meat tender. This class comprises about twenty species, including both trees and shrubs, and all are native to tropical America.

PAPAW.

PAPER, a material made by chemical and mechanical processes from vegetable fiber, straw, rags, wood, bark, and other substances, and used for wrapping, writing, printing, and many other purposes. The ancients did not make paper like that manufactured at present, but instead prepared a product from papyrus, a reed native to Egypt, securing from the inner bark the principal writing material that served various purposes for many centuries among the nations bordering on the Mediterranean. The name paper was derived from papyrus, but the ancient product was very much unlike the paper now used. It was prepared by laying strips of the inner bark of the papyrus plant so they would lap over each other, and these were united to each other by pressure, the juice of the plant supplying the necessary amount of mucilaginous matter to hold the parts together. At present over 400 different materials are employed in making paper, but the best consist of esparto grass and rags, and paper written or printed on is also used extensively for remanufacture.

It is thought that the manufacture of paper similar to the kinds now used dates from the 2d century B. C., when the Chinese produced an excellent quality from vegetable fibers, especially cotton. The manufacture of paper from vegetable fibers was introduced in the western portions of Asia several centuries later, and its manufacture in Europe was first instituted in Spain by the Moors about 1154. Soon after manufactures developed in France, Germany, and Italy, and by the 14th century paper-making had grown into an important industry. The use of vegetable fibers in paper-making declined considerably in the 16th century, for the reason that it was discovered that cotton and linen rags are excellent materials for making a fine product, and many persons found employment in gathering old material of this character for the factories. The invention of printing and the publication of large editions of various books and periodicals increased the consumption rapidly. Subsequently the demand was enhanced by the use of paper for hangings, wrappings, and various other purposes. This circumstance caused much energy to be devoted to the selection and employment of a large number of substances that offered to supply cheaply and abundantly the popular demand. In 1772 a German paper manufacturer named Schaffers published a catalogue containing specimens and prices of paper made from sixty-five different vegetable substances.

The process of manufacturing paper depends largely upon the kind of material used. Within recent years vast machinery has been perfected by which the product is not only improved, but the output has been greatly enlarged. Three principal classes of paper are recognized, including wrapping paper, printing paper, and writing paper. Wrapping paper is made in most cases of jute and old ropes, and the staple writing and printing paper from rags and esparto. However, a large quantity of printing paper is made of wood-pulp, with which a certain per cent. of cotton waste and rags is added to give it strength. The best grade of writing and printing paper is still made from rags, whether by hand or machine. The process of manufacture differs somewhat according to the kind of material used, though in all grades it is necessary to prepare the substances by cleaning them of all the dust and dirt, and separating them according to the kind of product wanted. They are next reduced to a pulp, which is cleansed and bleached, and afterward sized by depositing on the fibers a slightly mucilaginous composition, when a coloring matter is added. This mass is subjected to beating, after which it is run through a strainer into the chests of the paper machine. From this chest it flows through an orifice and is spread in the form of a thin film on a mechanical contrivance that rapidly absorbs moisture, and,

when it is sufficiently dried, passes between a series of rollers that gradually tighten until it is reduced to the desired thickness. The last of the rollers are sufficiently heated by steam to take out the remaining moisture and give it a glossy appearance. It is then wound upon large rollers to be marketed, or cut into different sizes as desired.

Machine-made paper consists of a continuous sheet, and newspapers of large circulation use webs several miles in length for printing, and these are not cut until after the paper has been printed. This is also the case with much of the wrapping paper, but the hand-made and the kinds used for divers purposes is usually slit into smaller sheets. William Rittinghuysen established the first paper manufactory in America, in 1690, on a tract of land now included in Philadelphia. Wood-pulp and wood fibers were first introduced by an American manufacturer about 1854, and as a result the price of paper has been greatly reduced. At present paper is used for many different purposes, including collars, articles of dress, car wheels, boats, water tanks and pails, and others quite similar, the processes of manufacture differing according to the purpose for which the product is designed. The United States produces more paper than any other country in the world. Other countries producing large quantities of paper include France, Austria, and Italy. Among the states having large paper manufactories are Massachusetts, Connecticut, Pennsylvania, New York, Ohio, Minnesota, Kentucky, and New Jersey.

PAPER HANGINGS, a class of ornamental papers manufactured to decorate the walls and ceilings of private and public buildings, which are generally attached by pasting. Paper of this class was first manufactured in China, but it is now used extensively in the United States and all the civilized nations. The designs are printed mostly by machines, just as calicos are printed. A grade of paper having a velvety surface is called flock paper, and is made by fastening shearings of woolen cloths to the paper by means of varnish. The finest grades of paper are hand-painted, though these are rarely used except in the most expensive buildings. Some of the colors used in making paper hangings are highly poisonous, and many are made of mineral substances.

PAPIER MÂCHÉ (pā-pyā′ mä-shā′), a material made from pulp paper or from pulp containing an admixture of size oil, resin, paste, or other substances. It is produced to some extent from sheets of paper glued and pressed together. There are many different processes, but the commoner varieties are prepared by pulping any kind or several kinds of paper into a mass of doughy consistency. To this earthy matters are added, such as sulphate of iron, glue, and quicksilver, to resist the action of water. It may be rendered fireproof to a considerable extent by adding a sulphate of soda and borax. There are many purposes for which papier mâché is used successfully. In Europe pipes and snuff boxes are made of it; in Persia it serves for trays and lacquered boxes, and it is variously used for tableware, desk furniture, and interior architectural ornaments. Other objects made of it include cigar boxes, tubes for drinking lemonade and other cold drinks, water pails, rims for bicycles, car wheels, utensils, doors, and matrices for stereotyping newspapers and books.

PAPILLÆ (pā-pĭl′lē), a term applied in physiology to the minute, soft prominences of the body, which serve the purpose of delicate sensation. The sense of touch is exercised chiefly by the papillæ of the skin, and the sense of taste by the papillæ of the tongue. Each single papilla projects above the skin or membranes, and may be divided or single, or it may have a secretory function.

PAPPENHEIM (päp′ẹn-hīm), **Gottfried Heinrich, Count von**, eminent soldier, born in Pappenheim, Germany, May 29, 1594; died in Leipsic, Nov. 7, 1632. He descended from an ancient Swabian family, and secured a liberal education at Altdorf and Tübingen. When twenty years of age he joined the Roman Catholic Church, and entered the military service under the king of Poland against Turkey and Russia. In 1620 he led the forces that defeated the Bohemians at Prague, and from 1623 to 1625 commanded the Spaniards in Lombardy. He was given a command by Austria in 1626, when he suppressed an insurrection of peasants, and soon after aided Tilly against Christian IV. of Denmark. After the death of Tilly, Pappenheim joined Wallenstein in the war with Saxony, and fought with him at Lützen against Gustavus Adolphus. While Wallenstein's army was retreating before the advance of the Swedes, he made a gallant charge upon the enemy's left wing, but fell mortally wounded with two musket balls in his breast and died the following day.

PAPUA (păp′o͞o-ạ). See **New Guinea**.

PAPYRUS (pā-pī′rŭs), a genus of rush-like plants of the sedge family, growing in marshy places from root-stalks. The stem grows to a height of from six to fifteen feet. It is naked, except near the root, and at the top is a bunch of leaves formed much like an umbrella. The flowers occur on scaly spikelets and are surrounded by long bracts, and the seeds are three-cornered. In former times the papyrus plant was cultivated to a considerable extent in Lower Egypt, but it is now of rare occurrence in that region. At present it is found extensively in Syria, tropical Africa, and southern Italy. The ancients used it in preparing writing material as early as 2000 B. C., and many written rolls made of this product still exist, some

of the papyri extant dating from the sixth Egyptian dynasty. Its preservation from remote centuries is due principally to the manner in which it is prepared and to the peculiarly dry climate of Egypt.

Writings on papyri do not constitute bound

EGYPTIAN PAPYRUS.

books, but form extensive rolls made by pasting together different parts of the inner bark of the papyrus plant with a gummy substance under pressure, and they were often thickened by pasting several layers together. The writing was done with a pen made of reed, and with an oil and charcoal ink. Papyrus newly prepared has a whitish color and may be rolled with ease, but later it assumes a brownish tinge and is quite easily broken. Many thousands of ancient writings committed to these papyrus rolls have been deciphered, and from some of them much information of historical value has been obtained. Different species of the plant are now of value in supplying materials for the manufacture of cordage, sandals, boats, sail-cloth, wearing apparel, and utensils. A fine class of mats is made from a species common to India, and several inventors have used the fibers obtained from others in paper making.

PARA (pä-rä′), or **Belem**, a city in northern Brazil, capital of the state of Para, situated on the estuary of the Para River, near the Bay of Guajara. It has a fine harbor, though its location is about seventy-five miles from the mouth of the river. The river channel is twenty miles wide at the city and sufficiently deep to admit vessels of the largest size. Among the improvements are paved streets, waterworks, a botanical garden, a college, and a number of public schools. Its principal buildings include the palace, the cathedral, and several fine churches. It has a vast export trade in india-rubber, cotton, coffee, sugar, tobacco, cocoa, live-stock, hides, and lumber. The manufactures include utensils, clothing, machinery, earthenware, and toys. There are imports of flour, cutlery, hardware, and cotton and woolen goods. The climate is healthful, and its tropical atmosphere is tempered by sea breezes. In 1835 it was the seat of a revolution, and its commercial progress dates from 1848. A large majority of the people are of Portuguese descent. Population, 72,350.

PARACHUTE (păr′ä-shut), an umbrella-shaped apparatus used chiefly by aëronauts in descending from balloons. It is constructed after the plan of an umbrella, and is carried upward with the balloon in a closed condition, but when the aëronaut starts to descend it expands at the top, thus serving to moderate the velocity of the descent. Parachutes were first used in 1617. Since then many have been manufactured and successfully employed in descending from great heights attained by balloons, and for descending precipitous mountains. However, they are not to be depended upon absolutely, and it is necessary to ascend a sufficient distance in order that the parachute may properly open and limit the descent to a safe velocity before the aëronaut reaches the surface.

PARAFFIN (păr′ăf-fĭn), a substance obtained by destructive distillation of bituminous shale, wood, coal, peat, and lignite. More recently it has been derived from petroleum and other liquid oils. It consists of a mixture of several hydro-carbons, has a waxy composition, and when pure is colorless and translucent. It has neither taste nor smell. Paraffin is manufactured extensively. The process includes heating bituminous shale in an iron retort for the purpose of condensing the tarry ingredients. These are next distilled and treated with chemicals, such as soda and acids, and afterward distilled a second time. After the product is cooled, it is submitted to pressure for the purpose of separating the heavy oily substances that contain the paraffin, and the latter is purified with naphtha, which is removed from it by pressure after cooling. Candles are made from refined paraffin, and with some grades a quantity of wax is mixed. The heavier oils obtained in distillation serve for lubricating machinery, and the lighter are used in illuminating. Paraffin products are useful in water-proofing, and serve as a protecting agency against atmospheric decomposition. To withstand the influence of the atmosphere, the obelisk in Central Park, in New York City, was coated with paraffin in 1885.

PARAGUAY (pä′rä-gwī), a large river of South America, rises in the Matto Grosso province of Brazil, and after a general course of 1,750 miles toward the south, joins the Parana at Corrientes. The valley of the Paraguay has extensive forests and much fertile land. In its upper course occurs the

Marsh of Xarayes, a large region of southeastern Brazil, which in the rainy season forms an expanse of water fully 200 miles from north to south. The principal tributaries of the Paraguay include the Vermejo, Apa, Tacuary, Cuyaba, Jaura, and Pilcomayo. It is navigable to Cuyaba, and thus forms a water course of much value to Paraguay and Brazil. Among the cities on its banks are Asuncion, Tres Bocas, San Pedro, and Concepcion.

PARAGUAY, an interior country of South America, surrounded by Brazil, Argentina, and Bolivia. Its area is estimated at 98,970 square miles. The drainage is toward the south, the principal rivers being the Pilcomayo, between it and Argentina; the Parana, between it and Argentina and Brazil; and the Paraguay, flowing through its interior. Paraguay is situated entirely in the river basin of the Parana, and consequently its soil possesses much fertility. Swamps abound along the Paraguay River, but the general surface is undulating, and there is a vegetation of great luxuriance. The only lake of note is Ypoao, and this is a body of shallow water. Vast forests skirt most of the hilly portions, and along the Parana and Paraguay are occasional tracts of almost impenetrable timber, though many of the lowlands consist of plains destitute of trees. The forests yield a large variety of excellent timber, india-rubber, gums, vegetable oils, perfumes, dye-wood, fruits, and tan bark. Minerals are not as abundant as in some of the more elevated countries of South America, but there are valuable deposits of petroleum, coal, fire clay, copper, iron, pyrites, kaolin, and marble.

Agriculture and stock-raising are the chief industries. Paraguay tea is the principal crop, but there are considerable productions of maize, wheat, fruits, tobacco, beans, mandioca, and cotton. Horses, mules, sheep, swine, and cattle are reared in abundance. Among the manufactures are matches, leather, soap, spirituous liquors, flour, sugar, brick, machinery, clothing, and utensils. The exports consist mainly of hides, oranges, timber, tobacco, perfumes, india-rubber, and Paraguay tea; and the imports of rice, textiles, and wines. Commercial enterprises with foreign countries are carried on mainly through Brazilian territory or by river navigation on the Rio de la Plata and its affluents. The public highways are in a primitive condition, though railroad and canal building has made some progress, and there are many miles of telegraph and telephone connections. Religious worship is free to all classes, but Roman Catholic is the state religion. A public school system is supported by taxation, and attendance at school is free and nominally compulsory, though only about thirty per cent. of the adult population are able to read and write. The national government has made valuable grants of lands to public schools, and extends subsidies to private institutions. The National College, at Asuncion, is maintained by the government. It has twenty professors, a fine library, and an attendance of about 300 students. Several well selected libraries, scientific and educational associations, and a number of newspapers are supported at the capital and the larger cities.

The history of Paraguay begins with 1515, when it was explored by Juan Diaz de Solis. The first settlement was made at Asuncion by a colony under De Mendoza in 1535. It was originally a possession of Spain, and a government by Spanish Jesuits was established in 1608, but they were expelled in 1758 by a force from Brazil, which was supported by dissatisfied residents. Its independence from Spain was secured in 1810, and the following year a consul was elected. The title of the chief executive was changed to dictator in 1814, which continued to be the official title until 1844, when Don Carlos Antonio Lopez secured an election as president for ten years. In the early administration of this official commercial intercourse was made free to all nations, and he remained the president until his death, in 1862. His son, Don Francisco, succeeded him, and soon after followed commercial treaties with the United States, Brazil, France, Germany, England, and other countries. A war with Brazil began in 1864, which terminated in 1870 by the death of the president.

In November, 1864, a new constitution was adopted in Paraguay, which vests the executive authority in a president for a term of four years. It provides for the maintenance of the five cabinet officers of foreign affairs, worship and justice, war, finance, and the interior. The legislative authority is vested in a congress of two houses, a senate and a chamber of deputies, the members of both being chosen by popular vote. All citizens between the ages of twenty and thirty-five years are liable to military service. The standing army numbers only about 1,500, and is maintained solely to preserve order in the republic. A river navy of several vessels is also supported. The people are mainly of Spanish descent, but include a large per cent. of half-breeds and Indians, and the official language is Spanish. Asuncion is the capital. Other thriving cities are Luque, Carapegna, Concepcion, San Pedro, and Villa Rica. The population, according to the latest estimate, is 655,571, of which 100,511 are Indians.

PARALLELOGRAM OF FORCES (păr-al-lĕl'ō-grăm), a term applied in physics to a parallellogram, two of whose adjacent sides represent in magnitude and direction two vector quantities, as forces or accelerations. The diagonal of the parallelogram drawn from their junction represents the resultant of the two forces.

PARAMARIBO (păr-a-măr'ĭ-bō), the cap-

ital of Dutch Guiana, situated on the Surinam River, about twelve miles from the Atlantic Ocean. It is regularly platted, the streets intersecting each other at right angles, has an extensive harbor, and is the principal commercial center of the possession. The chief buildings include a governor's palace, several fine churches, a number of schools, and a college. It has a number of gardens and parks, and the streets are covered with shell sand. The climate is moist and somewhat unhealthful. Among the principal manufactures are sugar, clothing, rum, molasses, chemicals, and textiles. Population, 29,550.

PARANA (pä-rä-nä'), an important river of South America, the next in size to the Amazon, having a length of 2,500 miles, and a basin of 1,240,000 square miles. Its source is in the southern part of Brazil, where it is formed by the junction of the Paranahiba and Rio Grande rivers. Its course is principally toward the south, and near the southwestern corner of Uruguay it enters the estuary of the La Plata. The Paraguay is its principal tributary, and other tributaries are the Salado, Tiete, Mogy, Ivahy, Guassu, Iguassu, and Paranapanema. The Parana River exceeds in size all the rivers of America except the Amazon and the Mississippi, and is larger than any of the great rivers of Europe. Near the entrance of the Iguassu are rapids extending about 100 miles, but it is navigable for more than 700 miles, and thus forms an important course for navigation. In its valley are forests of deciduous trees, and its fisheries are productive, yielding many species of fin and shell fishes.

PARASITES (păr'ă-sīts), a term applied to forms of life subsisting on other living organisms. Animal parasites attach themselves to the exterior or interior portions of other animals, where they feed and take from them nutritious substances already assimilated in a large measure. Some forms of parasitic animals secure nothing more than an abode, while true parasites feed upon and live from the substance of the animals which they infest, such as hydratids, tapeworms, flukes, body lice, and bird lice. Parasitic plants subsist and receive nourishment from other plants, but the list includes a number that subsist on animal tissues, these being generally called entophytes. Epiphytes are different from parasitical plants in that they subsist merely on decayed particles of the bark and other parts that do not constitute a portion of the living plant. The most important parasitical plants include the small fungi, such as smut, rust, and brand. The mistletoe and laranthus are among the larger forms of this class, both having green leaves. Other forms having scales instead of leaves include the broom rape and dodder.

PARCHMENT (pärch'ment), a material for writing prepared from the hide of a sheep, she-goat, young calf, or some other animal having a thin skin. The ancients prepared writing material of this class as early as 500 years B. C., and in the time of Herodotus it formed an important material in book making. Parchment is prepared by removing the hairs from the skin, after which it is stretched over a frame for the purpose of removing the fleshy parts by scraping, care being taken to have it entirely free from wrinkles. It is next reduced to about one-half its former thickness by rubbing with slacked lime and a pumice stone. Transparency is secured by placing it for a short time in a solution of sulphuric acid, and it is also rendered tough by the same operation. Drum-heads are made from wolf skins, sieves from the skins of goats, and vellum is a fine parchment made from the skins of kids and calves. A substance known as paper parchment was invented in 1847. It is used for legal and other documents, and especially for some kinds of maps and diplomas.

PARE (pä-rā'), **Ambroise**, noted surgeon, born near Laval, France, in 1517; died in Paris, Dec. 22, 1590. He was apprenticed to a barber and surgeon, and after developing a desire to study anatomy and surgery, went to Paris to pursue a course in those branches. His limited means made it impossible to secure instruction from teachers of eminence, but he acquired the use of a number of books and was later admitted for training in the Hotel Dieu of Paris. He joined the army as surgeon in 1536, and soon after accompanied the forces to Italy, where he attained much success in the treatment of wounds by applying ligature instead of cauterizing with iron at red heat. This mode of stopping hemorrhage by closing the arteries had been used previously, but it had not yet come into the general practice. His success in this line caused the Royal College of Chirurgy at Paris to select him as the president, and Henry II. appointed him court surgeon in 1552. Later he attended Francis II., and subsequently became king's surgeon to Charles IX. and Henry III. His writings embrace a number of treatises on surgery, and contain valuable and authoritative chapters on gun-shot wounds. "Five Books of Chirurgy" embraces his principal work, which has gone through many translations.

PARIS (păr'ĭs), county seat of Edgar county, Illinois, located 170 miles south of Chicago. It is at the junction of several railroads. In its vicinity is a fertile agricultural and dairying country, which contains deposits of bituminous coal. Among the manufactures are ironware, machinery, carriages, flour, and utensils. Paris has a number of fine schools and good municipal facilities, including waterworks and electric lights. Its buildings include a modern courthouse. Population, 1900, 6,105.

PARIS, a city in Texas, county seat of Lamar county, ninety-six miles northeast of

Dallas. It is surrounded by a fertile farming, fruit-growing, and stock-raising country, and has connection by a number of important railways. Among the manufactures are machinery, canned goods, flour, artificial ice, furniture, wagons, cotton products, and farming implements. The general facilities include pavements, electric lighting, waterworks, and good schools. It is the seat of the North Texas University, and has a fine courthouse. Population, 1900, 9,358.

PARIS, the capital and metropolis of France, third city in Europe and fourth in the world, being exceeded in population only by London, New York, and Berlin. It is situated on the Seine River, 108 miles from its entrance into the English Channel. The river has a course of eight miles in the city, and is connected in various directions by canals, thus affording a fine system of navi-

ARCH OF TRIUMPH.

gation. Many important railroad lines enter the city, providing transportation facilities to all parts of Europe, and it constitutes by far the most noted railroad center of France. A line of fortifications twenty-two miles in length surrounds the city, and outside of it are forts arranged in two main lines. The Seine is from 425 to 525 feet wide, encloses within the city three islands, known as the islands of St. Louis, Cite, and Cygnes, and embankments and quays protect the city from inundations. These embankments provide excellent boulevards, but the improvement known as The Boulevard forms an irregular arc on the north side of the Seine, extending from Place de la Madeleine to Place de la Bastille. The river is crossed by many beautiful bridges, and in many places are groups of trees in the quays, thus affording both convenience and pleasure to the citizens.

Most of the houses in Paris are built of white calcareous stone and the usual height is from five to seven stories, each floor being arranged in compartments for separate tenement dwellings. The older part of the city is grouped largely in the vicinity of the Ile de la Cite, which contains the Cathedral of Notre Dame. There the streets are irregular and narrow, but in the newer part they are wide, regular, and well paved. Public lighting with gas and electricity is supplied, and electric car lines extend to all portions of the city. There are many suburban railways and passenger stations, and tramway lines connect with many of the suburbs. An adequate supply of city water is secured from the Seine and Marne rivers, from artesian wells, and the Ourcq Canal. Paris has a larger number of beautiful parks than any other city in the world. The principal ones include Place Vendome, in which is located a column and statue of Napoleon I.; Place des Vosges, containing the statue of Louis XIII.; Place du Carrousel; Place de la Republique, with the republic statue; Place de la Bastille, containing the column in commemoration of July, 1830; Place de Rivoli, containing the equestrian statue of Joan of Arc; Place de Chatelet, containing the column commemorative of the Italian campaign of 1796; Place Moncey, with a monument to commemorate the defense of Paris in 1814; Place de l'Etoile, with the arch of triumph; Place de la Concorde, a large and beautiful public square, and numerous others.

Paris as a whole is rich in statues and monuments, which collectively represent the most important events of French history, including both the grandeur of its victories in battle and the achievements in the arts of peace. It has numerous public gardens laid out with more than the usual taste, and they are cared for with remarkable skill. The Gardens of Tuileries are within the city, where may be seen statues and fountains of great beauty; the Luxembourg Gardens are in front of the palace, and contain a great variety of rare plants and a number of conservatories; the Jardin des Plantes, the Buttes-Chaumont Gardens, and many others. Pere la Chaise is a celebrated cemetery covering 107 acres, and in it are many splendid monuments and tombs. The ancient quarries known as the Catacombs lie under a region in the south part of the city. Much of beauty and historic value was destroyed by the Commune in 1871, but the French people rapidly replaced the improvements, and at present its public institutions are possessed of unexcelled beauty.

The educational institutions of Paris take high rank among those of modern Europe. There are kindergarten, elementary, and grammar schools in all parts of the city, and besides these is a fine system of colleges and other institutions of higher learning. The Academy of the Sorbonne ranks among the most noted of the higher institutions. Other institutions include the University of Paris,

a famous center of learning established in the 13th century; the College of France; Ecole Polytechnique; Ecole des Beaux Arts; and the schools of St. Louis, Charlemagne, Descartes, Corneille, De Vanves, Fontanes, and many others. It has a vast number of splendid hospitals, excellent zoölogical and botanical gardens, museums of natural history, lecture rooms, and various professional, scientific, and religious institutions. The most noteworthy library is the Bibliotheque Nationale, which contains 2,295,000 volumes of printed books, 3,000,000 pamphlets, 200,000 manuscripts, and 6,500 portfolios of engravings. Other noted libraries are connected with the universities, colleges, public schools, and other institutions. Many learned societies have their seat in Paris, among them the celebrated Institute of France. The theaters are classed as the most numerous and among the finest in the world, including such renowned institutions as the Opera Comique, Theatre Dramatiques, Theatre Francais, Folies Dramatique, and the Odeon. There are vast and valuable collections of works of science, fine arts and history, and a splendid museum of artillery.

Paris has a large number of magnificent public buildings and palaces. The Louvre is occupied by a museum, and is on a site that was formerly the seat of a castle built in the 13th century. The palaces include the Tuileries, a splendid structure partly destroyed by the Commune, but subsequently restored; Palais Royale; Palais du Luxembourg; Palais de Justice; Palais de la Elysee, and the residence of the president. Other noted buildings include the Cathedral of Notre Dame, founded in the 12th century; Hotel des Invalides, a retreat for disabled soldiers, which contains the burial place of Napoleon I.; Hotel de Ville; Tribunal de Commerce, and the Eiffel Tower. The latter is the highest building in the world. It is constructed of iron lattice work, 984 feet high. There are many beautiful churches of historic interest, among them the Pantheon, Madeleine, l'Oratoire, and the St. Vincent de Paul. Others of special interest include St. Germain des Pres, an ancient structure dating from 1163; Sainte Chapelle, built by St. Louis in 1245, in which he placed several relics brought from the Holy Land; and the Sacred Heart, on the heights of Montmartre.

The city has manufactures of a large variety of commodities, among them cotton and woolen goods, carriages, lace, embroidery, scientific instruments, artificial flowers, silk textiles, leather products, sugar, chemicals, tobacco, clothing, machinery, engines, and utensils. It takes prominence for its production of a vast variety of ornamental commodities, including jewelry, combs, fine handkerchiefs, perfumery, and many others. The tobacco factories are chiefly in the hands of the general government, as well as large interests in printing, dyeing, knitting and weaving. Many books and periodicals are published regularly. Paris is the financial center of France and one of the most important of Europe, and takes high rank as a center of fashion. There is an important market in the various manufactures, fruits, cereals, and spirituous liquors. The city is divided for governmental purposes into twenty districts, and the prefect is appointed by the national government. This officer is the chief of the municipality. He is assisted by a council chosen by popular vote, and the prefect of police is at the head of the civic guard. It has a fine organization to protect against fire, a splendid sewerage system, and other institutions under the direction of the municipality.

The first historical information obtainable in relation to Paris indicates that its ancient site was confined to an island in the Seine, on which a tribe of Gauls, known as the Parisii, had their principal seat, and occupied themselves in rude agriculture and fishing in the Seine. The city was afterward named from this tribe. The Romans under Cæsar conquered the Parisii, and their island town became known as Lutetia. In 53 B. C. it formed an important Roman seat of influence and later was strongly fortified by them. Julian was stationed there in 360 A. D., when that general was summoned as emperor by the soldiers, and shortly after it was named Paris. The Franks conquered it about 508, when it was made the seat of government by Clovis. It ceased to be the capital in the time of Charlemagne, but Hugh Capet established a dynasty in 987 and converted the capital of the duchy of France into the capital of the kingdom, and since then it has remained the seat of government. From that time on its population increased with rapidity, and in the time of Philip Augustus, in 1200, it became the seat of a university, which for many years flourished as the most famous in Christendom, and the city ranked second only to Constantinople. Robert de Sorbon, a priest, founded the celebrated Sorbonne in 1253, which aided in attracting many students to Paris. A pestilence and famine spread desolation in the reign of Charles VII., in 1437-38, but with the ascension of Louis XI. prosperity returned and vast improvements were instituted. Henry IV. and Louis XIV. graded many of the streets, constructing much of the boulevard improvements still remaining. They established educational institutions and systems of drainage, sewerage, waterworks, and pavements. The Bastille fell in 1789, and with the ascension of Napoleon vast sums of money were spent in building arches, bridges, public squares, and gardens.

Napoleon III. did more than any other sovereign to improve Paris and modernize it by straightening and widening its streets and establishing a system of lighting. He caused the institution of public squares, fountains,

zoölogical and botanical gardens, and many splendid monuments. These improvements were followed by the International Exhibition of 1867, when Paris ranked among the finest cities in the world. A vast army of Germans laid siege to the city in the War of 1870-71, but exercised care in preserving the institutions of value and beauty. The destruction resulting from this war is to be attributed to the Commune, under whose influence the most splendid monuments and buildings were destroyed, but these have been restored with marked care, and many other excellent improvements have been effected. The most noteworthy include the opening of new thoroughfares; the establishment of the Champs de Mars, in which the Eiffel Tower is situated; the building of electric railway lines, and effecting extensive improvements in pavements and other municipal facilities. Paris was the seat of the finest international exhibitions in the world occurring within recent years, those most noteworthy being held in 1855, 1867, 1878, 1889, and 1900. The exhibition of 1889 was instituted to commemorate the centenary of the French Revolution, and was attended by 25,000,000 persons; while the great exposition of 1900 was intended for a universal exhibit of works of art and industry and agricultural products, and was attended by 50,120,540 people. The population of Paris is 2,665,500.

PARIS, or Alexander, according to Greek mythology, the second son of Priam, king of Troy, and Hecuba. It is related that Hecuba dreamed she would give birth to a flaming brand, and the dream was interpreted to signify that her son would destroy the city of Troy. In order to prevent such a catastrophe, she caused the babe to be exposed on Mount Ida to perish, where he was found by shepherds, who reared him as their own child. He developed remarkable strength and beauty, and his courage commended him to a beautiful nymph named Œnone, whom he married. Paris proceeded to Troy to witness the funeral games of a departed relative of the king, and while there won the victory from the proud young princes. Soon after he was brought to the presence of his parents, who recognized him as their son. He was at once appointed on the delicate mission of proceeding to Salamis to recapture the beautiful Hesione, whom Hercules had carried away. Proceeding with his fleet to Greece, he met Helen, the loveliest woman of her time, who was soon after given in marriage to Menelaus. Later Menelaus went on a hunting tour, and in his absence Paris carried Helen away to Troy, on account of which the celebrated Trojan War resulted. It was his arrow that killed Achilles, but he died from a wound received by a poisoned arrow shot from the bow of Phyloctes. Œnone at first refused to heal him, but repented and offered to apply remedies when it was too late to save his life. The remorse at his death caused her to kill herself.

PARIS, Treaties of, a number of important treaties made at Paris, France. The peace of Paris, concluded Feb. 10, 1763, ceded all the possessions east of the Louisiana Territory, Canada, and Nova Scotia from France to Great Britain. The treaty of Feb. 6, 1778, was made between the United States and France. By its terms the latter country recognized the independence of the thirteen colonies. The so-called first peace of Paris was concluded on April 11, 1814, and by its terms Napoleon was banished to Elba. The second treaty of Paris followed the return of Napoleon from Elba and his one hundred days of empire. It was concluded in 1815. This treaty reduced the territorial limits of France and provided for its occupation by a foreign army. The declaration of Paris, ratified on March 30, 1856, concluded the Crimean War and made provisions in regard to the goods of non-combatants confiscated during war time. The treaty of Oct. 12, 1871, finally concluded the terms of settlement after the Franco-German War. It provided for the payment of a war indemnity and the cession of territory to Germany. The treaty that concluded terms of peace between Spain and the United States was signed in Paris Dec. 10, 1898, and provided for the relinquishment by Spain of the islands of Cuba, Porto Rico, and the Philippines, the United States paying $20,000,000.

PARK, Edward Amasa, theologian and educator, born in Providence, Rhode Island, Dec. 29, 1808; died in Andover, Mass., June 5, 1900. He secured a degree at Brown University, took a course at Andover Seminary, and soon after was appointed Congregational minister at Braintree, Mass. In 1836 he was elected to the chair of moral philosophy at Amherst College, and in 1847 became teacher of sacred rhetoric at Andover Seminary. Afterward he was professor of Christian theology in the same institution, in which capacity he labored with success until 1881. He was editor of "Bibliotheca Sacra" for forty years, published a number of books of hymns and biographies of prominent Americans, among them Joseph S. Clark, Leonard Woods, and Charles Storrs. His translations include a volume entitled "German Selections."

PARK, Mungo, noted traveler, born in Selkirk, Scotland, Sept. 10, 1771; died Nov. 19, 1806. He received a good education, studied medicine in Edinburgh, and became assistant surgeon on the Worcester, a vessel that sailed to the East Indies in 1792. In 1793 he returned to England, where he was employed by the African Association of London to secure intelligence at their expense. Accordingly he sailed for Africa in 1795, reaching Gambia in the latter part of that year, where he studied the Mandingo language, but on reaching Pisania was taken captive by a Moorish chief. He escaped

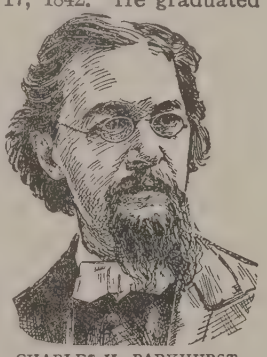
from captivity in 1796, and after three days reached the valley of the Niger. After proceeding down its course to Silla, he again traveled in the kingdom of Mandingo, and in 1798 returned to England. Two years later he published at London an account of his travels, entitled "Travels in the Interior of Africa." Later he settled as a surgeon at Peebles, but in 1815 secured government aid to make a second journey to Africa. His company consisted of thirty-five Europeans, with whom he left Pisania in the early part of 1805, but all except four died in the rainy season. With these he undertook to reach the source of the Niger, but at Baussa they were attacked by natives and all lost their lives. A report of the second voyage was published in 1815 from notes secured as a result of the tour.

PARKE, John Grubb, soldier, born near Coatesville, Penn., Sept. 22, 1827; died Dec. 15, 1900. He graduated from the West Point Military Academy in 1849, and served as a topographical engineer until the beginning of the Civil War, within which time he made surveys on the northwest boundary of the United States. In 1861 he was made brigadier-general and given a command at Fort Macon. Subsequently he commanded under General Burnside in the battles of South Mountain and Antietam, and was chief of staff to that general at Fredericksburg and Vicksburg. In 1863 he commanded the left wing of the army under General Sherman at Jackson, and took part in the defense of Knoxville and in the campaign against Richmond in 1864. Before the end of that year he became major of an engineer's corps, and in 1884 was made colonel. In 1887 he was appointed superintendent of the West Point Military Academy, where he served with much success.

PARKER, Theodore, noted clergyman, born in Lexington, Mass., Aug. 24, 1810; died in Florence, Italy, May 10, 1860. He was the son of a farmer, John Parker, graduated from the Harvard Divinity School in 1836, and soon after became minister of a Unitarian church at West Roxbury, where he remained until 1843. In the latter year he visited the principal countries of Europe, and the following year located in Boston, where he attracted large congregations at Melodeon and Music halls. Parker became distinguished as a lecturer against slavery, and his voice and pen were alike effective in fearlessly treating social and political reforms. In 1859 he visited Santa Cruz, Mexico, for the purpose of coming in touch with the climate favorable to those suffering with lung trouble, but soon after sailed to Italy, where he died. His principal publications include "Sermons for the Times;" "Transient and Permanent in Christianity;" "Experience as a Minister," and "Discourse of Matter Pertaining to Religion." He was editor of the "Spiritual Interpreter" for several years, and contributed to a large number of periodicals. The Boston Free Library received as a bequest his fine library of 13,000 volumes. He was buried in a cemetery outside the walls of Florence, Italy.

PARKERSBURG, a city of West Virginia, county seat of Wood county, on the Ohio River, ninety-five miles below Wheeling. It is connected with other cities by numerous railroads, has a fine county courthouse, a United States postoffice building, several excellent schools, and about twenty churches. The surrounding country contains extensive deposits of petroleum, and produces cereals, grasses, tobacco, and fruits. Among the manufactures are machinery, furniture, lumber products, chemicals, ironware, refined oil, boilers, and hardware. The city has a good system of public lighting, substantial pavements, waterworks, and other municipal facilities. Population, 1900, 11,703.

PARKHURST, Charles H., social reformer and clergyman, born in Framingham, Mass., April 17, 1842. He graduated at Amherst College in 1866, and studied theology in the German universities at Halle and Leipsic. In 1867 he was elected president of the Amherst High School, and later became pastor of the Lenox, Mass., Congregational Church. His studies in Germany were pursued in 1869, and in 1872-73, when he visited a number of the leading countries of Europe, and in 1880 was called to the pulpit of the Madison Square Presbyterian Church in New York City. Shortly after he was elected president of the Society for the Prevention of Crime, in which office he made a vigorous campaign of reform, and in 1892 denounced the municipal government of that city, his opposition being founded largely on the control of the city's affairs by party politics. His influence in theological affairs was thrown on the side of a revised confession of faith, and he supported Charles A. Briggs in approving much of the so-called higher criticism. His writings include "Blindman's Creed;" "Our Fight with Tammany," and a number of contributions to periodicals.



CHARLES H. PARKHURST.

PARKMAN, Francis, historian, born in Boston, Mass., Sept. 16, 1823; died near there Nov. 11, 1893. He studied at Harvard University, where he graduated in 1844, and in the meantime wrote a history of the French and Indian War, a work of much excellence and research. He read law for

two years after graduating, and then traveled in the west to study the life of the Indians located in the Rocky Mountains. An account of this expedition was given in several contributions to the "Knickerbocker Magazine." Subsequently he went to France and Quebec to search for definite information in relation to the early struggle for mastery between the Indians and the whites, and the conflicts among the European nations. The devoted work done by Parkman will be better appreciated on considering his delicate health and weak eyesight, but his writings are marked with brilliant and graphic style and give evidence of research, candor, and fairness. The later years of his life were spent in Jamaica Plains, near Boston, where he died. His writings include "Oregon Trail;" "Conspiracy of Pontiac;" "Jesuits in North America;" "Pioneers of France in the New World;" "Old Régime in Canada;" "La Salle and the Discovery of the Great West;" "Count Frontenac and New France under Louis XIV.;" "A Half Century of Conflict," and "Montcalm and Wolfe."

PARLIAMENT (pär'lĭ-mẽnt), the supreme legislature of the united kingdom of Great Britain and Ireland, consisting of the house of lords and the house of commons. The name was first applied in France to signify a general assembly of the state about the middle of the 12th century, under Louis VII., but the body itself originated from the ancient Teutonic system of popular representation in government. After the Norman conquest, in 1066, the national assembly was transformed into a selected royal council dominated by the king, but the lost powers were regained from time to time, and in 1215 it became recognized in the Magna Charta as the supreme legislative body of the kingdom. In 1266, in the reign of Henry III., the name parliament was applied to it, and in the middle of the 14th century, in the reign of Edward III., the separation of the two houses into lords and commons occurred. It may be said that no parliament existed between 1461 and the middle of the reign of Henry VIII., that being the period when the long struggle between the Stuarts and the parliament occurred, which terminated in a long civil war and the execution of Charles I. Under William III. full powers were again restored to parliament, and since 1716 its legal period of duration has been seven years. In 1801 the Irish parliament was dissolved by the act of union, and it was provided that Ireland should have twenty-eight members in the house of lords, to serve for life, and one hundred members in the house of commons, to be elected.

Parliament is convened by the sovereign, who appoints the time and opens the proceedings by the delivery of an address, either personally or by deputy. The parliament at present is composed properly of three bodies—the lords spiritual, the lords temporal, and the commons. The lords spiritual constitute the clergy, and originally sat in both houses, but in modern times their representation is wholly in the house of lords. Besides the clergy, the house of lords is made up of peers created by the crown and hereditary peerage. The number of peers in 1903 was 593. This body is presided over by the chancellor, who is the keeper of the great seal. The right to originate bills to provide revenues is denied the lords; in this respect it is similar to the American senate. There are 670 members in the house of commons, of whom 490 represent counties and boroughs and five universities of England and Wales; seventy, counties and boroughs and two universities of Scotland; and 101, counties and boroughs and two universities of Ireland. The house of commons selects its own speaker from its membership. Members of neither house receive a salary. Each house can adjourn for a short time, but neither can be terminated except by the sovereign, and each may form its own rules. A quorum in the lower house is made up of forty members, while the upper house has no prescribed quorum. The sovereign has the right to approve or veto a bill. The legislative authority extends to all the colonies and possessions. A dissolution is caused by a ministerial crisis, when a new body is elected by appealing to the people. The powers of parliament are numerous, being influential to a large extent over the sovereign. It can destroy any ministry and alter the succession to the throne, a course taken by it in several instances, and it has also changed the national religion.

The American colonies seriously questioned the right of parliament to legislate for them. James Otis in 1761 asserted that parliament did not have the right to tax the colonies for the reason that they were not given representation in that body. A general protest was made against the stamp act in 1765, and shortly after the Revolutionary party took the position that parliament had no right whatever to legislate for the colonies. The parliament of 1768-74 was noted for its opposition to popular rights both in England and America, and by its policy greatly hastened the Revolution. The Massachusetts Charter Act, Boston Port Act, Quartering Act, and Quebec Act were among the most objectionable. They operated to mold the spirit that finally caused American independence.

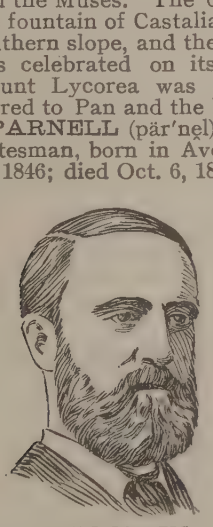
PARMA (pär'mą), a city of northern Italy, capital of the province of Parma, on the Parma River, seventy-one miles southeast of Milan. It is beautifully situated in a fertile region of the Lombard plain, has convenient railroad connections with other trade centers, and is noted for its excellent public buildings. Among them is a fine cathedral, the Church of San Giovanni, the Church of La Steccata, the ducal palaces,

and the Baptistry. It has a fine public school system, a noted university, several colleges and museums, and a public library of 120,000 volumes. Among the manufactures are cotton and woolen goods, silk textiles, clothing, paper, earthenware, soap, and wearing apparel. Parma was founded by the Etruscans, and in 183 B. C. became a Roman possession. It was the residence of Petrarch in 1341-2. Population, 44,240.

PARNAHIBA (pär-nä-ē'bä), a river in northeastern Brazil, rises near the boundary of the province of Goyaz, and after a course of 800 miles toward the northeast, flows by a delta into the Atlantic Ocean. It has a number of large tributaries, and at several places in its course are cataracts. Its basin is a highly fertile region, and much of its course is navigable.

PARNASSUS (pär-năs'ŭs), a snow-capped mountain range of Greece, located in Phocis, sixty-four miles northwest of Athens. Its highest peak is Mount Lycorea (now Liakura); height 8,075 feet. It rises over the town of Delphi in two prominent peaks, and is celebrated in history as the seat of Apollo and the Muses. The oracle of Delphi and the fountain of Castalia were situated on its southern slope, and the worship of Bacchus was celebrated on its highest peak. In Mount Lycorea was the Corycian cave, sacred to Pan and the Muses.

PARNELL (pär'nęl), **Charles Stewart**, statesman, born in Avondale, Ireland, June 28, 1846; died Oct. 6, 1891. His family was associated with Irish parliamentary life for about a century, and his father, Charles Henry Parnell, owned an estate in Wicklow county, Ireland. The early education of the son was provided for in several private schools, and he afterward took a course at Cambridge. Shortly after graduating he made a tour in the United States, and on returning home in 1874 became sheriff of Wicklow county. The following year he was elected to parliament for Meath county, and soon became famous as an advocate of home rule. He introduced a bill to amend the church law of Ireland in 1877, which was defeated by a decisive vote, but Parnell at once rose to influence and eminence in the Irish party. He became president of the Irish National Land League in 1879, and the following year lectured in the United States, where he secured $350,000 to aid in furthering the principles of that organization.



CHARLES S. PARNELL.

Parnell was chosen to parliament from several districts in 1880, but decided to represent Cork, and in the same year instituted boycotting by depriving a party at Ennis of his former patronage. He opposed the land act and crimes act in 1881, and for violation of the latter was placed in Kilmainham jail, from which he was released in 1882 through the influence of Captain O'Shea. When the land league was disorganized by government interference, he collected large sums of money and in 1883 organized the National League, of which he was made president. At that time Gladstone became friendly to home rule, and Parnell gave him his political support. The "London Times" published a series of articles in 1887 which charged Parnell and his associates with being implicated in outrages committed by members of the Irish national party, and these were investigated by a commission of three, and in 1890 Parnell was exonerated from the principal ones by parliament. In the latter year the divorce proceedings of Mrs. O'Shea implicated Parnell in a very questionable manner, and by this he lost the support of many former friends. Though a Protestant, he was supported in his public career by the Irish priesthood, but after these charges had been published they refused longer to extend him their influence. Some time after he married Mrs. O'Shea, but his former party became divided into Parnellites and anti-Parnellites, and in the midst of party dissensions his death occurred.

PAROS (pā'rŏs), or **Paro**, an island in the Greek Archipelago, one of the Cyclades, situated west of Naxos, from which it is separated by a channel about five miles wide. The island is fourteen miles long, nine miles wide, and has a mountainous surface. Mount St. Elias, its highest peak, is 2,535 feet above sea-level. Its coast regions and valleys are fertile. The products consist of cotton, honey, wax, vegetables, fruits, poultry, and sheep. It is famous for its marble and contains many valuable antiquities. The Cretans first colonized it, but it was annexed subsequently by the Persians, and there Miltiades received his fatal wound after the battle of Marathon. Naussa, on the north coast, is the principal seaport, and Parikia, on the west coast, is the largest town, having a population of 2,250. The island has a population of 7,025.

PARRHASIUS (par-rā'shĭ-us), eminent Grecian painter, born at Ephesus near the close of the 4th century B. C. He lived and practiced his profession in Athens, where the inhabitants conferred upon him the rights of citizenship. It is related by Seneca that he procured a prisoner captured by Philip of Macedon, whom he crucified in his studio for the purpose of securing a copy from life to convey the expression of agony to his famous painting, entitled "Prometheus Chained," but the story is unfounded. Another writer associated him with Zeuxis.

The latter had painted a picture of grapes so excellently that birds came to peck at them, and when Parrhasius was called on to rival this production he asked Zeuxis to draw aside a curtain to examine his picture. The latter found to his astonishment that the curtain was itself the picture. Hence Parrhasius deceived Zeuxis, while the latter only deceived birds. Parrhasius was a prolific painter of various natural and historical scenes, and some of his works are still extant. Among his best known works are "Meleager and Atalanta" and "Ulysses Feigning Insanity."

PARROT (păr'ŏt), a genus of tropical birds classed with the climbers. The genus includes many beautiful species, most of them being distinguished by their brilliant and gaudy plumage. They have a hooked bill and live largely in trees, in which the

PARROT.

bill aids them in climbing. On the ground they are peculiarly awkward. The food consists mostly of seeds and fruits, but some species feed on the tender parts of plants and bulbs. In size they vary from the love-birds, a species not larger than sparrows, to the great macaw, which is fully three feet in length. They are seen principally in flocks, build their nests in trees, and attain to a great age, often from fifty to seventy-five years. The voice is coarse and harsh, and they can be taught to imitate speech with peculiar exactness. Though docile and affectionate when domesticated, they show an irritable temper when aggravated. The gray parrot is a native of West Africa, and develops a high degree of skill in imitating the human voice. The Carolina parrot is native to the United States, and the green parrot to South Africa. Other species include the cockatoo, lory, paroquet, and lorikeet.

PARROTT, Robert Parker, inventor, born in Lee, New Hampshire, Oct. 5, 1804; died in Cold Spring, New York, Dec. 24, 1877. In 1824 he graduated from the West Point Military Academy, where he was assistant professor of mathematics and natural philosophy for five years, and in 1831 entered the military service, taking part in the Creek War of 1836. He was made superintendent of ordnance at West Point in 1836. While in charge of the cannon foundry of that institution he invented the rifled cannon known by his name, which was used by the government in the Civil War. Subsequent to the war he became an official in several industrial enterprises.

PARRY (păr'ĭ), **Sir William Edward,** navigator and explorer, born in Bath, England, Dec. 19, 1790; died at Ems, Germany, July 8, 1855. He was the son of a physician who designed that he should study medicine, but in 1806 joined the navy, and in 1810 became lieutenant, in which capacity he commanded a ship to the Arctic for the purpose of protecting the British fisheries. In the War of 1812 he was dispatched to blockade the United States coast, making an expedition up the Connecticut River in 1813, and subsequently remained in American waters until 1817. In 1818 he commanded the Alexander on a voyage to discover the northwest passage, explored Barrow Strait in 1819, and subsequently spent nine years in exploring the Arctic Ocean and endeavoring to reach the north pole from Spitzbergen. The honor of knighthood was conferred upon him in 1829, and soon after he became commissioner of agriculture in Australia. In 1834 he returned to England, where he was made comptroller of steam for the royal navy. In 1852 he was made rear-admiral, and the following year appointed lieutenant-governor of Greenwich Hospital. His death occurred while in Germany at a health resort. He published "Lecture on Seamen;" "Nautical Astronomy at Night," and "Parental Character of God."

PARSEES (păr'sēs), **Fire Worshipers, or Guebres,** the name by which the modern followers of Zoroaster are known. Their religion is founded upon the dogma that there are two primeval causes of the real and intellectual world—the Vohu Mano, or Reality, and the Akem Mano, or Non-reality —while their moral philosophy is based on the trinity of Thought, Word, and Deed. From the theory of the two primeval causes of reality and non-reality developed, after the time of Zoroaster, the supposition that there are two gods to be worshiped, one of good and the other of evil. That the soul is immortal was one of their tenets long before that belief came to be general among the Semites, and they had a conception of future reward and punishment much in advance of the Hebrews. The good deity is known as Ormuzd, whose symbol is fire, and on this account they hold it in great reverence. Their religion spread rapidly, and at the time Alexander the Great invaded Asia their priests numbered fully 40,000, and their sacred book, the Zend-Avesta, was widely circulated. The Persians under

Artaxerxes looked with favor on the religion of Ormuzd mainly to secure the influence of the Parsees. It flourished until in 651 A. D., when the Persians were defeated near Ecbatana by Caliph Omar, and soon after followed extensive persecutions by the Mohammedans.

Many of the Parsees fled to India in the early part of the 8th century, where fully nine-tenths of the followers of that religion now reside. Among the peculiarities are included the custom of not eating any food cooked by a person of a different religion. Their food is largely vegetable; their worship is in fire temples, in which altars are maintained, and on them the sacred fires are burning continually; and they recognize their own caste and creed in contracting marriage. They do not bury their dead, but expose them on a so-called temple of silence, where vultures devour the flesh, and the bones fall through a grating into a pit below. These towers are about twenty-five feet high, and the corpse is placed on the grate through a door at the side of a wall that surrounds the upper portion. The Parsees are considered the most hospitable and industrious class of India, and a large per cent. of the business is at present in their hands. The latest estimates place the number of adherents to their faith in India at 73,250, and those in Persia at 8,500. They are notably eager to secure an education for their children in the public schools and other institutions.

PARSONS, a city of Kansas, in Labette county, on the Big Labette River, about thirty-four miles south of Humboldt. It is surrounded by a fertile farming country, which produces cereals, grasses, and fruits. The city has good railroad facilities, and is an extensive market for farm produce, merchandise, and dairy products. Among the manufactures are furniture, plows, ironware, flour, edged tools, and utensils. It has a number of excellent schools, fine churches, and good municipal facilities. Population, 1900, 7,682.

PARTHENON (pär'thĕ-nŏn), a noted temple of Greece, situated on the Acropolis at Athens. The ruins of this structure indicate that it constituted a splendid specimen of architecture. It was dedicated to Athene, the goddess of wisdom and armed resistance, and in it was a world-renowned statue by Phidias, which ranked second only to that of Zeus by the same eminent artist. This statue was thirty-nine feet high and was composed of ivory and gold. Its majestic beauty formed the chief attraction of the temple, though there were many others of interest. The Parthenon was built in the Doric style of Pentelic marble. Originally it had eight columns on each front, forty-six in all, of which thirty-two still remain. The structure had a length of 228 feet, was 101 feet wide, and sixty-four feet in height. The Christians used it as a church, and later it became a Moslem house of worship. It remained in good condition until 1687, when the Turks used it as a magazine, and an accidental explosion of a quantity of powder brought it to its present state of ruin. Specimens of sculpture from the Parthenon have been taken to the museums of many countries.

PARTIES, Political. See **Democrat, Republican, etc.**

PARTON, James. American author, born in Canterbury, England, Feb. 9, 1822; died in Newburyport, Mass., Oct. 17, 1891. He came to the United States in 1827, attended the public schools in New York City, and later taught in the schools of Philadelphia and New York City. His first literary work was in connection with the "New York Home Journal," and in 1856 he published the "Life of Horace Greeley." In 1856 he married Sara Payson Eldridge, who wrote a number of excellent works under the name of "Fanny Fern." In 1875 he removed to Newburyport, Mass., where he devoted the remainder of his life to literary work. His principal productions include "Life of Andrew Jackson;" "People's Book of Biography;" "Life of Voltaire;" "Life and Times of Aaron Burr;" "Life of Thomas Jefferson;" "Captains of Industry;" "Famous Americans of Recent Times," and "Life and Times of Benjamin Franklin." His wife, Sara Payson Eldridge, was born in Portland, Maine, July 11, 1811; died Oct. 10, 1872. She first wrote for the "New York Ledger," and later for the "Home Journal," signing her name "Fanny Fern." Her writings include "Fern Leaves from Fanny's Portfolio;" "Volume of Chit-Chat;" "New Story for Children," and "Little Ferns for Fanny's Friends."

PARTRIDGE (pär'trĭj), a genus of birds of the grouse family, including a number of widely different species of game birds, and distributed more or less in all the continents. In color the common partridge is ash-gray with markings of brown and black. The body is round and stout, and measures about twelve inches in length. Its wings and tail are short, the bill is heavy, and the tarsi and toes are naked. The flight is rapid for a short distance, but it is not able to endure movement on the wing in extended flight. Ants are the favorite food of young partridges, and adults feed mostly on larger insects, seeds, and the cereals of cultivated fields. The young remain with the parents in a convoy until late in the fall, and toward winter packs are formed by the union of convoys. The parents exercise much care in protecting their brood by allowing them to escape into thickets while the adults attract the attention of the hunter. Among the different species are the common partridge; the Arabian partridge of western Asia; the African partridge; the Indian partridge of southern Asia; the Greek partridge of southern Europe, and the red-legged partridge, or French partridge, of western Europe. The

ruffed grouse of the United States is known as a partridge in some localities. All species

PARTRIDGE.

are hunted for their flesh, which is a pleasant and nutritious food.

PARTRIDGE BERRY, a small trailing, evergreen herb of the madder family, largely distributed in North America. It has round-ovate, opposite leaves of a dark-green color, white flowers in pairs, and bears a scarlet double berry. The berries are relished by birds. Many species of birds are frequently seen gathering them from the vines in the winter time. A related species common to North America is known as wintergreen. The partridge berry is not favored as an edible food, its fruit being almost tasteless.

PARTS OF SPEECH, the term applied to the different classes into which the words of a language are divided, the division being based entirely upon the meaning and use that words have in a sentence. There are nine parts of speech, in case we consider the participle and the interjection as separate classes. These embrace noun, adjective, pronoun, verb, participle, adverb, preposition, conjunction, and interjection. A noun is the name of anything; an adjective is a word used to limit or qualify the meaning of a noun; a pronoun is a word used in place of a noun; a verb is a word used to express action, being, or state; a participle is derived from a verb, partaking of the properties of an adjective, a verb, or a noun; an adverb modifies the meaning of a verb, adverb, adjective, or participle; a preposition expresses relation between its object and some other word; a conjunction connects words, sentences, or parts of sentences; and an interjection denotes some sudden or strong emotion. Most grammarians regard the three articles, a, an, and the, essentially as adjectives, and they do not class the interjection as a distinct part of speech. Parsing consists of naming the part of speech, telling its properties, pointing out its relation to other words, and giving the rule for its construction.

PASADENA (păs-ą-dē′ną), a city of California, in Los Angeles county, nine miles northeast of Los Angeles. It is surrounded by a fertile agricultural and fruit-growing region, which yields cereals, grasses, and fruits. It has excellent railroad and electric car facilities, and is noted as one of the most popular health resorts of the Pacific coast. Among the manufactures are flour, cigars, wine, clothing, canned fruits, wire, earthenware, and utensils. The city is supplied with gas and electric lights, has excellent public schools, a number of fine churches, and contains splendid hotel facilities. Population, 1900, 9,117.

PASCAL (păs′kąl), **Blaise**, philosopher and mathematician, born in Clermont, France, June 19, 1623; died in Paris, Aug. 19, 1662. He was the son of Etienne Pascal, an educator in Auvergne, and in 1630 he was taken to Paris for the purpose of securing a liberal education. His father personally superintended his training, making a specialty of language work, and later devoted special attention to mathematics and philosophy. In 1639 he wrote a treatise on conic sections, three years later invented a calculating machine, and in 1641 took up the study of religion at Rouen. Soon after he made valuable discoveries in relation to atmospheric pressure and the equilibrium of forces, and by publishing two treatises in relation to physics attained a reputation as a physicist. In 1647 he settled at Paris. He became united to the Jansenists in 1654, and spent most of his time in the monastery of Port Royal, though he did not become an absolute observer of the rigorous rules of that order. The later years of his life were marked by failing health, and he brought upon himself the opposition of the Jesuits by his liberality. Some of his works have been translated into many languages and have gone through a number of editions, particularly his "Lettres Provinciales."

PASHA (pą-shä′), or **Bashaw**, a military title borne by princes and high civic officials in Turkey. This title was formerly bestowed only on princes of royal descent, but now it is conferred upon governors of provinces, military commanders, and others rendering extraordinary services to the nation. Three grades are recognized—pashas of one, two, and three horse-tails, so called from the ensigns formerly borne before them as standards when they appeared in public. The first includes governors of minor provinces and brigadier-generals; the second, valis and generals of divisions; and the third, viziers and corps commanders. In many respects the office of pasha is quite like that of the ancient Persian satraps. Turkish pashas formerly governed with absolute sway, but now their powers are limited by councils and courts.

PASKEVITCH (päs-kęh′vĭch), **Ivan**

Feodorovitch, eminent soldier, born in Poltava, Russia, May 19, 1782; died in Warsaw, Jan. 29, 1856. He was of Polish descent, became a page to Czar Paul, and later entered the regular army. In 1805 he served against the French at Austerlitz, took a prominent part in the campaign of 1812, and in 1825 became commander-in-chief of the Russian army in Persia, from which country he secured an important command in Persian Armenia. His distinguished services caused the czar to create him count of Erivan, and also to grant him $793,000. Subsequently he conducted several campaigns against the Turks, and in 1831 became field-marshal, when he suppressed an insurrection in Poland with great vigor. In 1848 he led an army of 200,000 men against the Hungarians, and in 1854 was given command of the army of the Danube, but shortly after resigned his position in the army. In 1850 the fiftieth anniversary of his military success was celebrated at Warsaw with much pomp. Several fine statues have been erected in his honor.

PASSAIC (păs-sā'ĭk), a city of New Jersey, in Passaic county, on the Passaic River, twelve miles west of New York. There are convenient railroad connections with other cities. It is beautifully located on elevated ground affording a fine view over the surrounding country. Passaic has electric lights and street railways, waterworks, a public library, well-paved streets, and several fine school and church buildings. The manufactures embrace cotton and woolen goods, chemicals, india-rubber, shoddy, machinery, whips, and utensils. The Passaic River rises in Morris county, and, after a tortuous course of about one hundred miles, flows into Newark Bay. It affords an abundance of water power, and is navigable for a short distance. At Paterson it has a fall of about fifty feet. In 1900 Passaic had a population of 27,777.

PASSAMAQUODDY BAY (păs-ą-mą-kwŏd'ĭ), an inlet from the Bay of Fundy, which forms a part of the boundary between Maine and New Brunswick. It receives the water from the Didgequash and St. Croix rivers. Its length is fourteen miles, width at the entrance eight miles, and within its confines are several islands. It has a number of fine harbors and valuable fisheries. The tides affect it considerably, rising about twenty-five feet.

PASSION FLOWER, a genus of twining plants, so named from the fanciful resemblance of certain parts of the flower to the objects associated with the crucifixion. The rays of the corona are regarded as representing the crown of thorns, the stigmas the nails, and the anthers the wounds. There are about 200 species, many of which are cultivated because of their flowering qualities and for their admirable adaptability for covering arbors and trellises. Most of the species are native to the southern part of the United States, tropical America, and the West Indies. The commonly cultivated species is from Brazil and is a shrubby climber. It has palmate leaves and bears large flowers of a bluish color on the outside and purple and white within. The passion flower native to the United States has three-lobed leaves, and bears large flowers and an edible berry of a pale yellow color, about the size of a small apple. Medical properties are secured from the roots, flowers, and leaves of some species.

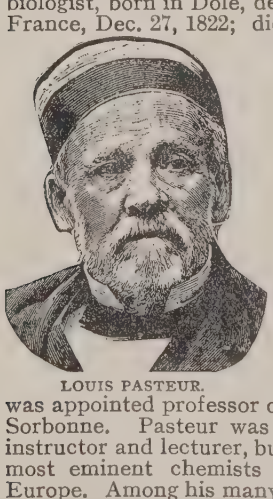
PASSION PLAYS. See **Miracle Play** and **Ober-Ammergau.**

PASSOVER (pàs'ō-ver), the principal Jewish festival, instituted to commemorate the event of the Lord's smiting the first-born among Egyptians and passing over the houses of the children of Israel. It is related in Exodus that the blood of the paschal lamb was sprinkled on the two side-posts and the upper door-post, and the flesh of the lamb was eaten with unleavened bread and bitter herbs before morning. All the houses in Egypt not so protected were visited that night by Jehovah to slay the first-born, and the emancipated Jews departed from Egypt the same night. The feast was instituted as an annual one, occurring during the full moon of the month of Nisan, corresponding to March, and included a term of seven days. At present the Passover Feast is celebrated by the Jews, but no lamb is sacrificed. Instead the meal partakes of the nature of a family feast, in which the shoulder of a lamb is eaten, leaven is put away, prayers and songs are indulged in, and other ceremonies are observed.

PASSPORT (pàs'pōrt), an official document issued to a person from his own government for protection and license to travel. A passport certifies to the citizenship of the individual holding it, and requests foreign governments to grant safe and free passage within their territory. There are many advantages in possessing a document of this character in case of accident or mishap to a traveler, but within late years they are infrequently insisted upon during times of peace. In the United States passports for foreign travel are issued by the department of state, but a citizen of the United States can obtain one from the legation of the United States in the country in which he may be, and they are also issued by a consul where no diplomatic representative is located. Passports are not necessary in the United States and England, though they are desirable. Germany requires foreigners who desire to reside for a short time in the large cities to be supplied with passports, while they are required in Russia and Turkey. In all the Turkish dominions, including Palestine and Egypt, they must be certified to by a Turkish consular officer before being valid within Turkish territory, but for convenience they may be certified to at New York before sailing.

PASTA, Giuditta Judith, opera singer, born of Jewish parents in Saronno, Italy, April 9, 1798; died near Lake Como, April 1, 1865. She first studied in her native town, and later took a musical course at the Conservatoire in Milan, where she was married soon after. She sang with moderate success as early as 1811, but her reputation was made in 1822, when she appeared with much success at Verona. Soon after she was engaged at the Italian Opera in Paris, where her singing was greatly admired, and from 1825 to 1830 she remained in that city, but also appeared successfully at London. In 1832 she accepted an engagement at Vienna, remaining there until the following year, and soon after withdrew from the stage and settled near Lake Como, where she died. Pasta had a pleasing voice, which passed with ease from high soprano notes to deep contralto tones. She was possessed of stately manners and excellent dramatic energy. Her principal roles were Nina, Medea, Camilla, Desdemona, and Semiramide. Bellini wrote "La Sonnambula" for her, in which she was much applauded. Her last engagement was at St. Petersburg, where she received $40,000.

PASTEUR (păs-tûr), **Louis**, chemist and biologist, born in Dole, department of Jura, France, Dec. 27, 1822; died Sept. 28, 1895.



LOUIS PASTEUR.

He studied at the Jena University, received a degree from the Ecole Normale in 1847, and the following year became professor of physics at Strasburg. In 1854 he was made dean of the faculty of sciences at Lille, three years later became scientific director of the Ecole Normale in Paris, and in 1867 was appointed professor of chemistry at the Sorbonne. Pasteur was not only an able instructor and lecturer, but ranks among the most eminent chemists and biologists of Europe. Among his many noted discoveries are the causes of certain deteriorations of wine, and how they may be prevented; the bacilli causing anthrax in cattle, and a cure by inoculation; the cause of hydrophobia by a microbe in the nerve-centers, with its prevention and cure by a cultured form of the same microbe; and the cause and cure of the diseases of the silkworm. The silk-industry of France had suffered great losses by widespread diseases affecting the silk-worms, and in 1865 it was almost ruined. Pasteur found that the blood of these insects was affected by disease germs which could be easily traced from the egg through the larval and chrysalis forms to the adult, and discovered that the disease is to be attributed to unhealthy moths, which are to be destroyed as a preventative of the disease in new generations. He founded the Pasteur Institute in Paris in 1888 for the treatment of rabies, and in 1890 a similar institution was established in New York City. Much of his attention during his later years of activity was devoted to a study of splenic fever in man, and to cholera in fowls and other animals, in both of which he announced valuable additions to scientific knowledge in the discovery of the treatment and culture of the bacilli attending those diseases. He was honored by all the leading countries and societies of the world, and his seventieth birthday was celebrated in 1892 by an official assembly at the Sorbonne. He contributed to many periodicals and wrote many excellent treatises, among them "Les Microbes;" "Nouvel Exemple de Fermentation," and "Etudes sur le Vin."

PATAGONIA (păt-a-gō'nĭ-a), the name generally applied to the most southern region of South America, lying south of the Negro River. It is bounded on the east by the Atlantic, south by the Strait of Magellan, and west by the Pacific. The total area is estimated at 322,550 square miles, of which 16,050 square miles are included in the islands along the southern and western coasts. A treaty made in 1881 divided the region between Chile and Argentina, the former securing 62,930 square miles, and the latter 259,620 square miles. The extensive archipelago of the Tierra del Fuego Islands is separated from the mainland by a coast frontage of 365 miles on the Strait of Magellan, and there are many extensive and rocky peninsulas.

The eastern part of Patagonia is included in the vast steppe-like plains extending along the Atlantic, which rise abruptly in successive terraces. The soil is more or less stony, and the vegetation consists of herbage and thorny brushwood. There is a scarcity of rainfall in some regions, and a number of salt marshes and lakes are situated in various portions. The drainage is principally by the Negro, Chico, Deseado, and Chubut rivers, all of which have a course toward the east and flow into the Atlantic. Among the animals are the puma, guanaco, zorrino, and water fowl, and along the coasts is an abundance of otters, fish, shell-fish, seals, and sea-elephants. The western part is mountainous and rugged, including an extension of the Andean system, and in the mountains are many varieties of forest trees. The prevailing winds are from the west; the winters are cold, and the summers are moderately warm. In some regions along the western coast rain and snowfall are abundant, and during the melting of the mountain snows the streams become rushing torrents. There are mineral deposits similar to those common to Chile.

Patagonia is inhabited principally by Indian tribes, who subsist mainly on the chase and by herding small droves of cattle on the pastoral lands. They belong to the Tehuelche or Patagonian Indians, and consist of two tribes, known as the northern and southern. These tribes of Indians are decreasing rapidly in number. In the summer seasons they are seen on the plains in charge of herds of cattle and fishing along the coast, while in the winter time they seek refuge in the forests and mountains toward the west. Colonies have been established there by both Argentina and Chile, and the latter also supports a penal settlement within the region. Some of the coast regions and a large number of valleys are fitted for European settlements, and the mineral wealth, fisheries, and forests offer inducements for capitalists and laborers. Patagonia was first sighted by the Spanish under Magellan in 1520, and it was explored by De Isla in 1535. Spanish settlements were founded there as early as 1580, but these settlers and others located subsequently left the region to settle farther north, since its climate is more severe and the inducements for extensive investments less encouraging. A Welsh colony was founded at the mouth of the Chubut in 1865, but it proved unsuccessful. The settlements that do exist were established almost exclusively by people from regions located farther north in South America. It is probable that large tracts will remain unpopulated for centuries.

PATAPSCO (pa-tăps'kō), a river in Maryland, which rises near the boundary line of Pennsylvania, and after a course of eighty miles toward the southeast, flows into Chesapeake Bay, fourteen miles south of Baltimore. It supplies an abundance of water-power and is navigable to Baltimore for large vessels. The valley of the Patapsco is fertile, and its fisheries are productive.

PATENT, a government grant to an inventor, whereby he secures for a limited time the exclusive right to make, use, and sell any new machine, process, or composition of matter, or any new and useful improvement. Nearly all civilized nations encourage and protect inventive skill and industry by granting patents, and some even go so far as to grant exclusive privileges for generations to the producers of new additions to mechanics, arts, and literature. The policy adopted by England in relation to the colonists was disastrous to the manufactures and inventions of the colonies, since it discriminated against them, but the adoption of the Declaration of the Independence at once led to the exercise of remarkable inventive genius. It is specially provided in the constitution that congress shall have power "to promote the progress of science and useful arts, by securing for a limited time to authors and inventors the exclusive rights to their respective writings and their respective discoveries." The first patent law was inspired by Thomas Jefferson and passed by congress in 1790. At present fully 45,000 applications for patents are made annually, and about one-half fail to secure an issue.

The patents issued in different years since the enactment of the first patent law in the United States take numerical rank as follows:

1790	3	1850	993
1795	12	1855	2,013
1800	41	1860	4,819
1805	57	1865	6,616
1810	223	1870	13,321
1815	171	1875	14,837
1820	155	1880	13,947
1825	204	1885	24,233
1830	544	1890	26,292
1835	757	1895	22,057
1840	473	1900	23,550
1845	503		

The laws of the United States formerly discriminated against foreign applicants, when a residence of one year in this country was required, and the fee for foreigners was fixed at from $300 to $600, but in 1861 all discrimination was repealed, except that against aliens coming from countries discriminating against citizens of the United States. In 1836 congress appropriated $108,000 to construct the present patent office, and in December of the same year a destructive fire destroyed practically all the contents of the patent office. In the same year the patent law was revised and improved in many respects, and the final revision of the statutes occurred in 1870. In 1877 another destructive fire occurred, doing damage to the amount of $60,000.

To obtain letters patent a distinct specification must be made by the applicant, giving a full and complete description of his invention. Drawings and models must be made in all cases where such are possible, and these must be deposited with the commissioner of patents. The fee to be paid by the patentee is $35, of which $15 must accompany the application, and the balance of $20 must be paid on an issuance of the patent. The fee of $15 remitted with the application is retained for making search through the patent office to ascertain whether there is not some conflicting patent already in existence, and it is not returned in case letters patent are refused. Patents are issued for a term of seventeen years, and cannot be renewed. The patent office belongs to the department of the interior, and the commissioner is appointed by the president, subject to confirmation by the senate. Information on this subject is sent free of charge by mail to any one requesting the patent office to do so. Pamphlets treating of rules of practice in the United States patent office, patent laws, and laws relating to the registration of trade-marks and labels are among the publications issued for free distribution.

PATERSON (păt'ẽr-sŏn), a city of New Jersey, county seat of Passaic county, on

the Passaic River, and popularly called the "Lyons of America." It is conveniently connected with other trade emporiums by a number of important railroads, has an extensive system of electric street railways, electric lights, well paved streets, waterworks, and many excellent school and church buildings. Among its improvements are two excellent parks, several hospitals, orphan asylums, charitable institutions, and a public library. Its manufactories employ more than 25,000 persons. The products include silk goods, linen thread, clothing, jute goods, flour, cotton and woolen goods, velvet, braid, tapestry, machinery, hardware, engines, and utensils. Paterson was noted as the center of the cotton industry of America until 1865, and it is now one of the principal silk manufacturing cities of America. It takes rank as the thirty-second city of the United States. The Passaic River is navigable to the city. Population, 1900, 105,171.

PATERSON, William, financier and founder of the Bank of England, born in Dumfriesshire, Scotland, in April, 1658; died Jan. 22, 1719. He descended from a family in financially poor circumstances and was for a time a peddler in England. In 1688 he established a successful business as merchant, and conducted a large trade with the West Indies from the Bahama Islands, where he resided for a time. Subsequently he settled in London as a mercantile trader, and in 1694 projected the Bank of England, of which he became one of the first directors. In 1695 he secured governmental sanction of the famous Darien Scheme, an enterprise by which he purposed to found a settlement on the Isthmus of Darien and control a large part of the world's commerce. After a few years the enterprise failed, and Paterson returned to England broken both in health and fortune, and soon after became an advocate of the treaty of union between England and Scotland, which was established in 1707. The government granted him an indemnity of $91,205 to cover the losses sustained by him, and he spent the later part of his life in London. He wrote much on economic questions, particularly on free trade. His works were published under the title "The Writings of William Paterson."

PATMORE (păt'mōr), **Coventry Kearsey,** poet, born in Woodford, England, July 23, 1823; died Nov. 26, 1896. In 1844 he published a volume of poems, and shortly after became a librarian in the British Museum, where he worked for twenty years. He removed to Hastings in 1868, where he built a large Catholic church, and afterward devoted many years to literary work. His principal publications include "Tamerton Church Tower;" "Angel in the House;" "Children's Garland from the Best Poets," and "Autobiography of Barry Cornwall."

PATMOS (păt'mŏs), or **Patmo,** an island in the eastern part of the Grecian Archipelago, located twenty-five miles south of Samos, and belonging to the Sporades group. It is about ten miles long and six miles wide, and bears evidences of having a volcanic origin. The surface is rocky and barren. Rude agriculture is carried on in a few localities, but the inhabitants engage more largely in fishing. The island is noted for the exile of the Apostle John. It was on this island that he saw the visions contained in the Book of Revelation. John the Divine built a monastery on an elevated mountain in 1088, and near it is the small town of Patmos. The population at one time numbered more than 12,000, and there are many ruins and traces of former prosperity. The island belongs to Turkey, but it is inhabited almost exclusively by Greeks. Population, 4,000.

PATNA (păt'na), a commercial city of India, situated in the Bengal district, on the Ganges River, 285 miles northwest of Calcutta. It is conveniently located along the river, and has extensive railroad and steamboat connections with other trade emporiums. Among the manufactures are clothing, utensils, tobacco products, earthenware, toys, linen goods, and wax candles. The city has a large export trade in opium, merchandise, cotton, tobacco, salt, oil seeds, and fruits. Its streets are narrow, and in the older portion they are tortuous and illy supervised. In the newer parts the streets are wide and regular, and contain a number of modern municipal facilities, including electric lights and rapid transit. The principal buildings include a Roman Catholic cathedral, the Nabob's palace, a Mohammedan college, Patna College, a number of mosques and tombs, and several educational and benevolent institutions. It is thought that the city was founded about 600 B. C., and in 419 B. C. became the capital of Bahar. British occupation led to a massacre in 1763. At present it ranks among the most important trade centers of southern Asia. Population, 169,500.

PATON, John Gibson, missionary, born in Dunfermline, Scotland, May 24, 1824. After taking a course in theology, he became connected with the Glasgow City Mission, and in 1858 engaged in the foreign missionary field under the Reformed Presbyterian Church. He entered upon a line of successful work in the New Hebrides, where he labored among difficulties with the natives at Tanna until 1862, when their hostility made it necessary to leave. Soon after he engaged in the Australian missionary field, and in 1865 became stationed on the neighboring island of Aniwa, where he converted all the natives to Christianity by diligent labor in a period of twenty years. In 1892-4 he visited extensively in North America and Great Britain, attending in the meantime the conference of the Presbyterian Church at Toronto. His autobiography was edited and published by his brother in 1889.

PATON, Sir Noel, historical painter,

born in Dunfermline, Scotland, Dec. 13, 1821; died Dec. 26, 1901. He studied at Royal Academy, and in 1845 exhibited a cartoon sketch, entitled "Spirit of Religion," at Westminster Hall. His oil paintings, entitled "Christ Bearing the Cross" and "Reconciliation of Oberon and Titania," jointly secured a prize of $1,500. Later he produced many paintings that were engraved, and published two volumes of poems. The best known of his later paintings include "Pursuit of Pleasure;" "Dante Meditating the Episode of Francesca;" "Home from the Crimea;" "In Memoriam;" "Luther at Erfurt," and "Man of Sorrows." He illustrated Aytoun's "Lays of the Scottish Cavalier."

PATRIARCH (pā'trĭ-ärk), a term applied originally to the progenitors of early tribes of mankind, specially to the antediluvians named in the Bible and to the early Hebrews, including Abraham, Isaac, and Jacob. After the destruction of Jerusalem, the term became the title of the principal officer of the Sanhedrim, in which executive authority was vested over the Jews of Syria and Persia. In the 5th century it came to be applied to the bishops of Alexandria, Antioch, and Rome. The patriarch of Constantinople became superior to those of Alexandria and Antioch at the time that city was made the seat of the empire, while the patriarch of Rome became the supreme pontiff of the West. Later a division resulted in the Latin church on account of conflicting authority between the patriarch and the pontiff of Rome, which gave rise to the Roman and Greek churches. The primate of the Greek Church in the Ottoman Empire at present is the patriarch of Constantinople, whose title is ecumenical or general patriarch.

PATRICIANS. See Plebeians.

PATRICK, Saint, the apostle of Ireland, probably born at Nemthur, in the British-Roman province of Valentia, in 396; died in Down, Ulster, March 17, 493. There is some uncertainty as to the place of his birth, but it is thought that his father had a small landed possession near the modern Dumbarton, on the Clyde River. A band of pirates seized him in his sixteenth year and sold him as a slave on the opposite coast of Ireland to an Irish chief, who was located in the region of the present county of Antrim. After serving six years as a herder of cattle, he escaped to France, where he entered a monastery at Tours. He visited Rome in 431, and was sent the following year by Pope Celestine I. as a missionary to Ireland. His work in Ireland was productive of remarkable results. After visiting all parts of the kingdom, he established his see at Armagh about the year 454, and it is asserted that he held several synods and secured the appointment of two bishops. It is said that he personally baptized 12,000, established 365 churches, and ordained a large number of priests. Only a few of his writings are extant, the most important being his "Confession" and a letter addressed to Coroticus, a Welsh chieftain, who was noted as a persecutor of Christians. Both these are rude in construction but have historical value.

PATTERSON (păt'ĕr-sŏn), **Daniel Todd,** naval officer, born on Long Island, New York, March 6, 1786; died Aug. 15, 1839. He entered the navy as midshipman in 1800, and soon after was taken prisoner by a flotilla of gunboats sailing under the colors of Tripoli, in which country he remained a prisoner till 1805. He commanded the naval forces at New Orleans in 1814, and received the thanks of congress for efficiently coöperating with General Jackson against the British. In 1825 he was given command of the Constitution, served in the Mediterranean in 1826-28, and in 1836 became commandant at the Washington navy-yard. His son, C. P. Patterson, born Aug. 24, 1816, graduated at Georgetown College, Kentucky, in 1836, and was commander of the Pacific mail steamer Oregon from 1850 to 1861. He held many important government positions as inspector and commissioner. His death occurred Aug. 15, 1881.

PATTESON (păt'ĕ-sŏn), **John Coleridge,** missionary bishop, born in London, England, April 1, 1827; slain Sept. 20, 1871. He was the eldest son of Sir John Patteson, graduated at Oxford in 1848, and in 1852 became fellow of Merton College. He was made curate of Alfington, Devonshire, in 1853, and the following year was ordained a priest. Shortly after he sailed as missionary to the Melanesian Islands in the South Pacific, where his successful work caused him to be consecrated bishop of Melanesia in 1861. He gained many friends among the natives and spread Christianity effectually, but was killed by a native of the Santa Cruz Islands as the result of an endeavor to quash the slave trade.

PATTI (păt'ee), **Adelina Maria Clorinda,** opera singer, born in Madrid, Spain, March 19, 1843. Both her parents were operatic singers. They brought her to New York City when a child. Her brother-in-law, Maurice Strakosch, instructed her in singing, and at the age of seven years she appeared at a concert in New York. Soon after she made a tour with Strakosch and Ole Bull in America, and later accompanied Maurice Gottschalk, the pianist, on a tour to the West Indies. She appeared in New York as Lucia in 1859, as Amina in "La Sonnambula" in London in 1861, and

ADELINA PATTI.

soon after visited the principal cities of Europe, Mexico, and South America. In 1868 she married Marquis de Caux, but was divorced from him in 1878, and in 1886 married Ernesto Nicolini. She made successful tours in the United States in 1881 and 1893, and soon after erected a theater in Wales, at Craig-y-Nos, her favorite residence. Patti is noted for her rich tones of voice, artistic skill in impersonation, and her charming and pleasing manner.

PATTISON, Dora Wyndlow, noted nurse, born in Hauxwell, England, Jan. 16, 1832; died Dec. 24, 1878. She was a sister of Mark Pattison, and in 1861 became a school teacher at Little Woolston. The devoted work of Florence Nightingale impressed her with the desire of aiding others, and in 1864 she joined the sisterhood of Good Samaritans at Coatham, and labored as a nurse in North Ormsby and Walsall. During epidemics of smallpox in 1868 and in 1875 she rendered efficient service, but died three years later on account of over-exertion. In 1886 a monument was erected to her memory by the working-men.

PATTISON (păt'ĭ-sŏn), **Mark,** scholar and author, born at Hornby, England, in 1830; died at Harrow Gate, July 30, 1884. He graduated at Oxford in 1837, two years later became a fellow of Lincoln College, and in 1861 was elected rector of that institution. Both as teacher and writer he attained to eminence, being greatly assisted by Emilia Frances Strong, whom he married in 1862. Among his principal writings are "Satires and Epistles;" "Sonnets of Milton;" "Report on Elementary Education in Protestant Germany;" "Tendencies of Religious Thought in England;" "Essays and Reviews;" "Memoirs;" "Essays," and "Sermons." He also contributed to various periodicals, and edited Pope's "Essay on Man."

PATTON, Francis Landey, clergyman and educator, born in Warwick, Bermuda Islands, Jan. 22, 1843. He studied at the Toronto University, Canada, took a theological course in the same city, and afterward studied at Princeton Theological Seminary, New Jersey, from which he graduated in 1865. He filled important charges as pastor in New York and Brooklyn from 1865 to 1874, and served as pastor in the Chicago Jefferson Park Presbyterian Church in 1874-81. In the latter year he became a professor at the Princeton Seminary and afterward its president. Patton ranks as a prominent theological writer and speaker, and was honored by degrees conferred by a number of the leading educational institutions of America. He contributed to many periodicals, and is the author of a number of authoritative works on theology and ethics. His chief works include "Inspiration of the Scriptures" and "Summary of Christian Doctrine."

PAUL, the name of five popes, three of whom are treated in articles below. Paul I. succeeded Stephen III. on May 29, 757; died on June 28, 768. During his reign a close alliance with Pepin, king of France, was maintained, and he was canonized on account of his piety and virtues. Paul II. was born at Venice, Italy, Feb. 28, 1418; died July 28, 1471. He succeeded Pius II. on Aug. 31, 1464. See **Pope.**

PAUL, Saint, distinguished apostle of Christianity, born at Tarsus, in Cilicia, about 3 A. D.; suffered martyrdom about 67 A. D. The place and date of his birth and death are largely traditional, good authorities disagreeing somewhat. It is generally held that he was of pure Jewish descent, and that he belonged to the tribe of Benjamin. His early name was Saul, which had been given to him in memory of the first Jewish kings, and he studied under the celebrated Jewish rabbi, Gamaliel, at Jerusalem. His training was that of a teacher. He became a member of the sect of the Pharisees, and with his associates was a persecutor of the Christians. The Pharisees showed much jealousy in their opposition to the followers of the Nazarene, since they represented the scholarship spread by the 480 synagogues, while the new converts to Christianity quite generally were uneducated. He witnessed the martyrdom of Stephen, and in the Acts of the Apostles are recounted the incidents attending his conversion by a vision of Jesus, which blinded him for some time. The next three years of his life were spent in Arabia, and when he returned his name was changed to Paul.

The apostolic labors of Saint Paul began at Damascus. Soon after he was joined by Barnabas, and the two carried on missionary work in Antioch, Asia Minor, Pisidia, and other regions of western Asia. Later Paul established churches in various regions of Galatia, Syria, the islands of the Mediterranean and in Greece. The most important churches that claimed him as their founder were those of Galatia, Corinth, Thessalonica, and Philippi in Macedonia. He was not only a powerful and effectual preacher of the gospel, but wrote epistles to the different churches established by him and to friends. The epistles of the New Testament assigned to him as author are fourteen, thirteen of which commence with his name, and the fourteenth opens abruptly, though the title Epistle of Paul has been prefixed to it. Most critics regard Paul the author of all fourteen; some think the one without his name prefixed was written by Apollos; and Ferdinand Christian Baur (1792-1861) regards the Epistle to the Romans, 1 Corinthians, 2 Corinthians, and Galatians the only ones purely of his authorship.

Saint Paul visited Jerusalem at different times, where he was always severely opposed by the Pharisees, and on the occasion of his fifth visit was placed under arrest and sent for trial before the Roman governor, Felix, at Cæsarea, who retained him as a prisoner

for two years. It was the privilege of a Roman prisoner to appeal to the emperor, which he did, and he was accordingly sent to Rome, but suffered shipwreck at Malta in the spring of 61. At the Roman capital he was treated with respect, and it is thought that he was acquitted. It is not known whether he left the city, though it is thought that he made several visits to Asia Minor and one to Spain. According to tradition he suffered martyrdom along with other Christians, who were charged unjustly with aiding to burn Rome in the time of Nero. He is regarded by all Christian sects as the most eminent advocate of early Christianity, and that he developed the teachings of Jesus. It is doubtful whether in the world's annals is to be found a character that in moral heroism is equal to Saint Paul; certainly none is superior.

PAUL III., pope from 1534 to 1549, born in Carino, Tuscany, Feb. 28, 1468; died Nov. 10, 1549. He descended from a noble Roman family, was liberally educated, and his pontificate shows him to have been a man of character and ability. It was his aim to surround himself by the most distinguished cardinals of his time, in which ambition he attained success. Among the notable incidents of his reign are the brief against slavery, in 1537; the bull instituting the Order of the Jesuits, in 1540; the council of Trent of 1545; and the decree of excommunication against Henry VIII. of England in 1538. He was identified with the struggle of Charles V. against the German Protestants. He had a son and a daughter before becoming a priest, the former of whom was duke of Parma and Piacenza.

PAUL IV., pope from 1555 to 1559, born in Naples, Italy, June 28, 1476; died Aug. 18, 1559. He secured a liberal education in Rome, became archbishop of Chieti, and in 1536 was made cardinal. In 1555 he succeeded Marcellus II. as pope, in which capacity he showed extremes in censoring and examining books, and was strict in punishing heresy. In the later years of his reign he refused to recognize Ferdinand as emperor of Germany on the ground that he held his permission necessary to allow Charles to abdicate, and became involved in trouble with Spain by favoring France. He was the first pope to issue a full official "Index Librorum Prohibitorum." He was a determined opponent of Protestantism, and coöperated with Queen Mary in her efforts to maintain Catholicism in England.

PAUL V., pope from 1605 to 1621, born in Rome, Italy, Sept. 17, 1552; died Jan. 28, 1621. He descended from a noble family, studied canon law, and in 1596 became cardinal. He succeeded Leo IX. after an exciting conclave. Among the memorable incidents of his reign is the contention with Venice that clergymen may not be subjected to trial in the courts of law, and in 1606 he placed the whole republic of Venice under an interdict for refusing to yield. The Venetians retaliated by commanding their clergy not to heed the papal censures, and banished all refusing to obey. Paul is noted as the pontiff who did more for the improvement of Rome than any other, his works including the building of the Borghese Chapel, constructing fountains and gardens, and improving the streets. He established missionaries in the East, and received embassies from India and Japan.

PAUL I., Petrovitch, emperor of Russia, son of Peter III., born Oct. 2, 1754; assassinated March 24, 1801. His mother, Catharine II., usurped the crown and required him to spend his early life in retirement. He succeeded to the throne on Nov. 17, 1796, at the death of his mother, and at once set at liberty Kosciusko and other Poles in prison at St. Petersburg. Army regulations were reformed by introducing German discipline, and shortly after he joined the allied powers against Napoleon, for which purpose he sent a large army under Suwaroff into Italy, and later dispatched an army to France. In 1800 a dispute arose regarding the island of Malta, and he seized the English vessels and goods that were then in the Russian ports. Later an agreement was concluded with Napoleon to invade the British possessions of Asia, but he was assassinated before the project could be accomplished. Napoleon and other French military authorities held the view that the assassination was brought about by English agents, though it was afterward declared that the conspirators purposed to compel him to abdicate, which he refused.

PAUNCEFOTE, Sir Julian, jurist and statesman, born in Munich, Germany, Sept. 13, 1828. He studied in Geneva, Paris, and Marlborough College, was called to the bar in 1852, and in 1865 became attorney-general of Hong Kong. Queen Victoria knighted him in 1874, and in the same year he became assistant under-secretary of state for the colonies. Two years later he was appointed assistant under-secretary of state for foreign affairs, and in 1882 became permanent under-secretary of state for foreign affairs. He served as British delegate to the conference at Paris in 1885 to draw up an act relative to the navigation of the Suez Canal, became British minister to the United States, and in 1893 was made ambassador. In 1894 he was associated with the privy council while on a visit to England, served as delegate to the peace conference at The Hague in 1899, and was raised to the peerage in the same year. He died May 24, 1902.

PAUSANIAS (paw-sā'nĭ-as), Spartan regent and general, son of Cleombrotus and nephew of Leonidas, and commander of the Greek forces in the battle of Platæa in 479 B. C. In this battle the Persians were defeated and Greece became forever freed from them. In 478 B. C. he commanded an expedition to Cyprus and to Byzantium, from both of which he expelled the Persians, and

for the purpose of making himself màster of Greece became implicated in treasonable relations with the enemy. He was recalled and tried at Sparta, but was acquitted on account of former services. Soon after he returned to Byzantium to consult with the Persians and to secure the assistance of Xerxes in acquiring control of Greece, and was again recalled and acquitted. Subsequently he incited the Helots to revolt, when the Spartans purposed to arrest him a third time. However, he took refuge in the temple of Athene, but the populace blocked the doors and starved him, his death occurring in 468 B. C. Plistoanax, one of his three sons, became king of Sparta.

PAVIA (pä-vē'ä), a city in northern Italy, located twenty miles south of Milan, on the Ticino River, near its confluence with the Po. It is the capital of the Pavia province, has extensive railroad facilities, and is surrounded by a fertile agricultural and fruit-growing country. Pavia has a considerable trade and numerous municipal facilities, including electric lights, waterworks, and stone pavements. Among the manufactures are porcelain, textiles, jewelry, wine, toys, musical instruments, and machinery. Its celebrated university was founded by Charlemagne in 774, and in the Middle Ages it ranked as a noted seat of learning. With it are affiliated a number of colleges, historical and anatomical museums, a school of fine arts, a botanical garden, and a library of 20,000 volumes. This institution has advanced courses of study and sixty professors, and is attended by about 1,400 students. Other noted buildings include the cathedral founded in 1488; a splendid monastery built by the first duke of Milan, situated four miles north of the city; the Church of San Petro; and the Church of San Michele, regarded the oldest in Italy. The Gauls founded Pavia, but Attila captured it in 453, and it was taken by Odoacer in 476. It was made the capital of Lombardy in the prosperous times of the Lombards, when it ranked as the most important city of Italy. The French were defeated there in 1525, but two years later it was laid waste by them, and Napoleon pillaged it in 1796. In 1814 it became a part of Austria, but since 1859 it has belonged to Italy. Population, 20,460.

PAWNEES (pạ-nēz'), a North American Indian tribe, who were first found in the basin of the Platte River, in Nebraska. They consisted of four different bands, known as the Grand Panis, Tapage Panis, Republican Panis, and the Lanks. Their hostility to the Sioux, Arapahoes, and Sacs and Foxes extended through a period of many years, but they were peculiarly friendly to the whites. A cession of their lands was made in 1833, when they were confined to a reservation on the north side of the Platte River, but in 1876 they retreated before the Sioux to southern Nebraska, and in the latter part of that year removed to Indian Territory. Their history includes an account of a number of brave chiefs. At present they are making rapid progress in educational and industrial arts. A vocabulary of their language has been published, but there is no extended grammar.

PAW-PAW. See **Papaw.**

PAWTUCKET (pạ-tŭk'ẹt), a city of Rhode Island, in Providence county, on the Pawtucket River, four miles northeast of Providence. The river supplies an abundance of water power, having a fall of about fifty feet. The city has convenient railroad and electric railway connections with other trade centers, substantial pavements, electric lighting, a number of fine schools, a public library, and a public park. It has fine residences and a number of excellent church buildings. Its manufactories employ about 8,000 persons, and represent a capital of $15,000,000. Samuel Slater established the first cotton factory in Pawtucket in 1790. Cotton goods and cotton thread are the leading manufactures. Other products embrace knit goods, braid, cement, textiles, dyed goods, plush, cordage, leather, ironware, machinery, packed meat, and boilers. It has a large trade in lumber, coal, cement, brick, and merchandise. The city has a number of daily and weekly publications, and representative branches of many leading civic, educational, and scientific societies. Population, 1900, 39,231.

PAXTON (păks'tọn), **Sir Joseph**, architect and ornamental gardener, born in Bedfordshire, England, Aug. 3, 1803; died June 8, 1865. He studied in the grammar schools of Woburn, became a gardener to the duke of Devonshire, and in 1851 designed the Crystal Palace constructed at the London International Exhibition. The successful construction of this structure caused him to be knighted. He was chosen a member of parliament in 1854, in which capacity he continued to serve until his death. He published "The Cottage Calendar" and a "Pocket Botanical Dictionary." Paxton was editor for a time of the "Botanical Magazine" and of the "Horticultural Register."

PAYNE (pān), **John Howard**, actor and dramatist, born in New York City, June 9, 1792; died in Tunis, April 10, 1852. He was employed in a New York counting-house at an early age. While there he edited the "Thespian Mirror," and in 1807 entered Union College, where he attended two years. His first appearance as an actor was at the Park Theater, New York, in 1809, and in 1813 he played successfully at the Drury Lane Theater, London. His theatrical career extended over a period of about twenty years, as actor, manager and playwright. Payne was the author of a number of operas and dramas. He was editor of the "Opera Glass," a London dramatic paper, in 1826-27, and in 1832 returned to the United States. He was consul at Tunis, Africa, in 1841-45, and was appointed to the same place a second time, in

1851, where he died the following year. The remains were removed from the St. George (Tunis) cemetery to Washington in 1893, and in both the cities are monuments to his memory. His principal literary production is the song "Home, Sweet Home" by which his name has been made immortal. Other writings include "Maid of Milan;" "Charles the Second," and "Brutus." A singular incident in connection with the life of Payne is that he never had a permanent home after the age of thirteen.

JOHN HOWARD PAYNE.

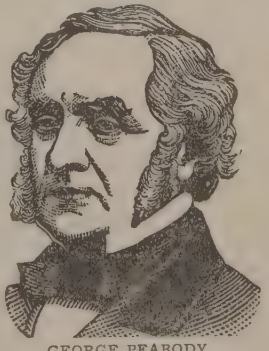
PAYSON, Edward, clergyman, born in Rindge, New Hampshire, July 25, 1783; died in Portland, Maine, Oct. 22, 1827. He was educated at Harvard University, and after studying theology became a Congregational clergyman in Portland, where he ministered efficiently to a large society until his death. His ability as a pulpit orator and student brought him into prominence. He published several volumes of discourses and sermons.

PEA, the common name of a genus of plants of the leguminosæ or pulse family. It is assumed that peas are native to western Asia, where several species grow wild, especially in the region of the Caspian Sea. They were cultivated as garden plants by the ancient Greeks and Romans, who obtained the improved varieties from the Egyptians. Their introduction into western Europe came about through traders from Holland, and thence to all parts of the world. About fifty species are cultivated, all of which have been improved by propagation. Two distinct varieties are recognized, known as the common pea and the eatable-podded pea. The latter is sometimes spoken of as sugar, skinless, and string pea, from the circumstance that its pod is sweet, tender, and succulent. In most climates it grows to a height of two to five feet. It bears long pods containing spherical seeds, flowers later than the common pea, and the plants should be supported by trellis work in order to secure the best yield. The common pea is cultivated very abundantly, largely because of its early yield of seeds, highly favored for cooking or canning while in an unripe condition. Its pods are rarely eaten, having a tough, parchment-like lining. The German dwarf pea is a favorite species for early use. It grows to a height of about nine inches, and if sown early in the spring in a rich, warm soil it yields abundantly. Other species include the little gem, Tom Thumb, Kent, and May pea. The cow pea grown in the southern states is a forage plant.

PEABODY, a city of Massachusetts, in Essex county, fourteen miles north of Boston. It is conveniently connected with other cities by railways, has modern municipal facilities, and numerous church and school buildings. Among the manufactures are glue, clothing, leather, textiles, earthenware, machinery, and utensils. It is the seat of the Peabody Institute, an institution founded by George Peabody, who endowed it with $200,000. The city was incorporated as South Danvers in 1855, but in 1868 it adopted the present name in honor of the philanthropist, George Peabody, who was born there. Population, 1900, 11,523.

PEABODY (pee'bod-i), **Andrew Preston**, clergyman and author, born in Beverly, Mass., March 19, 1811; died in Boston, March 10, 1893. He completed a course at Harvard University by graduation in 1826, studied theology at Cambridge, and soon after became pastor of the South Parish Church in Portsmouth, New Hampshire, where he labored till 1860. In that year he became pastor to Harvard University, and from 1861 to 1881 was professor of Christian morals in that institution. From 1852 to 1863 he edited the "North American Review," and was a contributor to various periodicals. After leaving Harvard in 1881, he devoted his attention to literary work and lecturing. His writings include "Sermons of Consolation;" "Manual of Moral Philosophy;" "Lectures on Christian Doctrine;" "Christianity the Religion of Nature;" "Harvard Reminiscences;" "Sermons for Children;" "Christianity and Science," and "Harvard Graduates Whom I Have Known."

PEABODY, George, merchant and philanthropist, born in South Danvers (now Peabody), Mass., Feb. 18, 1795; died in London, England, Nov. 4, 1869. He descended from a New England family that had immigrated six generations before his birth, was educated at a district school, and at the age of eleven years he became clerk in a grocery store. After serving in the War of 1812, he formed a partnership with Elisha Riggs in a dry-goods store in Georgetown, D. C. In 1815 the business was removed to Baltimore. Branch stores were soon after founded in New York and Philadelphia, and in 1837 he established himself as merchant and money broker in London. He discontinued connections with the American business establishments in 1843 and devoted his energy to the development of his institution in England, where he came into



GEORGE PEABODY.

possession of much wealth, which he used largely for philanthropic purposes.

In his lifetime Peabody gave away $5,500,000. These gifts include $1,000,000 to Peabody Institute in Baltimore; $10,000 to the North Polar expedition under Dr. Kane; $25,000 each to Kenyon College, at Gambier, Ohio, and Phillips Academy, Andover; $50,000 for educational purposes in North Danvers; $200,000 to found the Peabody Institute in South Danvers; and $2,500,000 for constructing homes for poor people in London, which are capable of accommodating 20,000 persons. In 1867 he established the Peabody Education Fund of $2,100,000 to be devoted to education in the southern United States, and in 1869 increased it to $3,384,000. This fund was first used to encourage the establishment of the public school system, but after schools were generally established it was applied to train teachers in institutes and normal schools, for which purpose it is used at present. Congress voted him special thanks for his large gifts to public institutions in America in 1867, and Queen Victoria offered him a baronetcy, but this he declined. However, the queen gave him a letter and her portrait, which is now on deposit in the Peabody Institute, at Peabody, Mass. His death occurred at Eaton Square, London, and the remains were taken to America and buried at Danvers, Mass. Statues have been erected to his honor in Baltimore and London. He left by will about $5,000,000 to relatives and friends.

PEACE, a river of Canada, which rises in the Rocky Mountains, in British Columbia, by two branches. It flows in a tortuous course toward the east and merges into the Slave River near Lake Athabasca, and enters the Great Slave Lake by five mouths as the Slave River. The delta of the Peace River is remarkably fertile, and its valley is rich and beautiful. Rapids impede navigation in many places, but it is navigable for some distance by small steamers. Its entire length is about 800 miles.

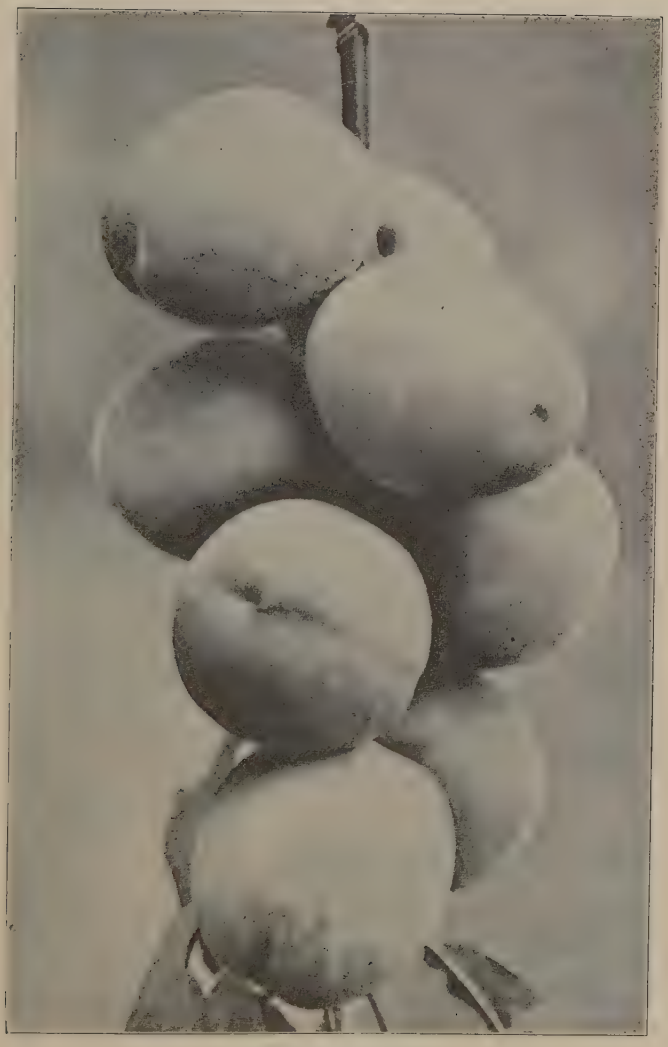
PEACH, a class of fruit trees including many varieties, and cultivated in all the countries having a warm or temperate climate. Some writers have classed the peach tree as a distinct genus, while others consider it allied to the almond, cherry, and plum. The size and shape differ largely according to soil and climate, though it may be stated that its general height is from eight to twenty feet. Its branches are irregular, the leaves glossy and lanceolate, and the rose-colored blossoms appear in early spring before the leaves are apparent. The fruit is fleshy, juicy, and highly flavored. It is a roundish drupe from one to three inches in diameter, has a downy reddish, yellowish, or whitish skin, and incloses a furrowed flattish stone. The peach tree is native to Persia and Syria, where several species grow wild. It was introduced into western Europe at an early date, and is now grown for the market in abundance. The two principal classes are the freestones and the clingstones so named on account of the stones

PEACH.

being free from or attached to the fleshy part of the fruit. Each of these classes includes many sub-varieties.

In the more severe climates peach trees bear only from two to three years, but in those having an equable and favorable climate they yield fruit successively for nearly one hundred years. Their highest perfection in the United States is reached in the middle states, including New York, Pennsylvania, New Jersey, Maryland, and Delaware. The peaches of California, Oregon, and Washington are large and of excellent quality. Michigan, Ohio, Illinois, and Missouri produce large quantities of peaches, which is true also of several adjacent states. All the southern states produce peaches, though the largest yield is in Georgia, where the annual production is about 5,750,000 bushels. The total yield of the United States averages about 40,500,000 bushels of marketable peaches. Those gathered for the market are picked by hand before fully ripe, and are shipped in refrigerator cars. Large quantities are canned and dried for the market, and a fine grade of peach brandy is made where large orchards abound.

PEACOCK, or Peafowl, a class of beautiful birds of the pheasant family, native to southeastern Asia. In the wild state peacocks are met with mostly while perching in trees, but they make their nests on the ground, where the peahen lays from twenty to thirty eggs in the early spring and may later be seen in company with a large brood of young, usually from ten to twenty. The young are quite difficult to rear in a cold climate, and the adult peacocks are quite unskilled in making rapid escape while on the ground. The males and females have a similar appearance until about two years old, when the tail coverts of the male begin to develop. They reach full development at three years, when the male has a



ELBERTA PEACHES.
(opp. 1384) Grown in Noble County, Oklahoma.

most beautiful appearance The common peacock is about the size of a hen turkey, and the wild birds are more brilliant than the domesticated. Both sexes are marked by various spots, but the tail coverts of the male are especially beautiful for their eye-

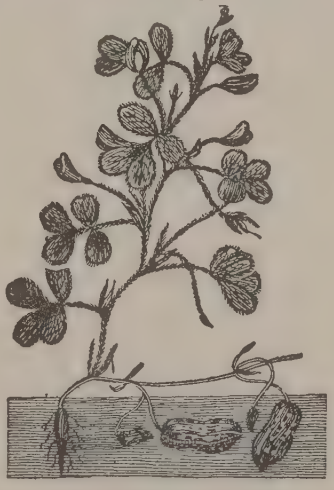
PEACOCK.

like spots, and they are much used for purposes of decoration. A fully developed male peacock has blue and golden colors. Formerly they were eaten, but now peacocks are kept chiefly for ornament in house and barn yards. The ancients regarded the peacock as the attribute of Juno, and the Christians of Byzantium looked upon it as a symbol of the resurrection. At present it is typical of vain-glory.

PEALE (peel), **Charles Wilson**, painter and naturalist, born in Chestertown, Maryland, April 16, 1741; died in Philadelphia, Feb. 22, 1827. He first learned saddlery, but soon after studied art under a German teacher in Boston and under J. C. Copley. Subsequently he was instructed by Benjamin West in London, but returned to America to serve in the Revolution, and commanded a company at Germantown and Trenton. His principal paintings include portraits of Washington, Steuben, Hancock, Hamilton, and Morris. He contributed a number of articles on science to periodicals and lectured on natural history. His writings include essays on "Domestic Happiness;" "Building Wooden Bridges," and "Discourse Introductory to a Course of Lectures on Natural History."

PEALE, Rembrandt, painter, son of Charles Wilson Peale, born in Bucks county, Pennsylvania, Feb. 22, 1778; died in Philadelphia, Oct. 3, 1860. He received instruction from his father, painted portraits at Charleston, South Carolina, and subsequently studied under Benjamin West at London. He visited Paris and other cities in Europe. A portrait of Washington painted by him in 1823 was purchased by the government for $2,000. His portraits embrace those of Perry, Jefferson, Cuvier, and Decatur. Other paintings include "Jupiter and Io;" "Napoleon on Horseback;" "Roman Daughter," and "Court of Death." He wrote "Reminiscences of Art and Artists;" "Notes on Italy," and "Account of the Skeleton of the Mammals." He contributed to the "Crayon" and edited the "Portfolio of an Artist."

PEANUT, Ground-Nut, or Ground-Pea, a trailing plant of the bean family, bearing a hairy stem, small yellow flowers, and



PEANUT—PLANT AND FRUIT.

two-paired primate leaflets. The flowers are sterile above ground. After they wither, the forming stalk of the ovary bends downward and forces the young pod underground, and the seeds mature some distance below the surface. There are from one to three seeds in the pod. Peanuts are cultivated extensively in various parts of the United States, especially in Virginia, the Carolinas, and other southern states. They thrive best in a light, sandy soil, yielding from thirty-five to one hundred bushels per acre. Many well-defined species have been obtained by cultivation, most of which are thought to be from plants native to Africa, where they are grown extensively, but other species are native to South America. They were cultivated on the Maranon River, in Brazil, as early as 1596. Where they are cultivated on

a small scale laborers take them from the ground with hoes, but on the larger plantations the roots and nuts are plowed out with a peanut digger. After drying several days in cocks or sheds, they are cleaned carefully and in some cases bleached. Large quantities are baked and eaten. They yield peanut oil, a product resembling olive oil, which is used extensively in manufacturing fine grades of soap. It is employed for salads and other purposes. The husks and shells of peanuts are useful in feeding stock. Some species may be grown as far north as central Illinois and Iowa, but they must be planted early, else the seeds do not mature.

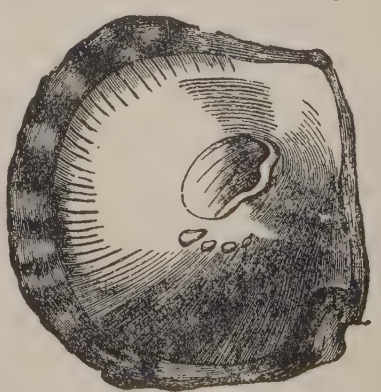
PEAR, a fruit tree belonging to the same genus as the apple, and cultivated extensively for its fruit. It is native to Eurasia,

PEAR.

where it may be found in many regions still growing wild, either in the form of a shrub or tree. The fruit in a wild state is small and the trees are thorny, but under cultivation the tree is thornless, grows to a height of from thirty-five to sixty feet, and in favorable climates attains a diameter of three feet. There are about 225 recognized varieties; thirty-six of these were cultivated in Rome at the time of Pliny. In some climates the trees bear only a few years, while in others they have been known to yield fruit for more than 300 years successively. The wood of old trees is hard and durable, and is of value in manufacturing musical instruments and turners' tools, and for wood engravings. The fruit has a juicier pulp than the apple, is somewhat longer, and tapers toward the stem end.

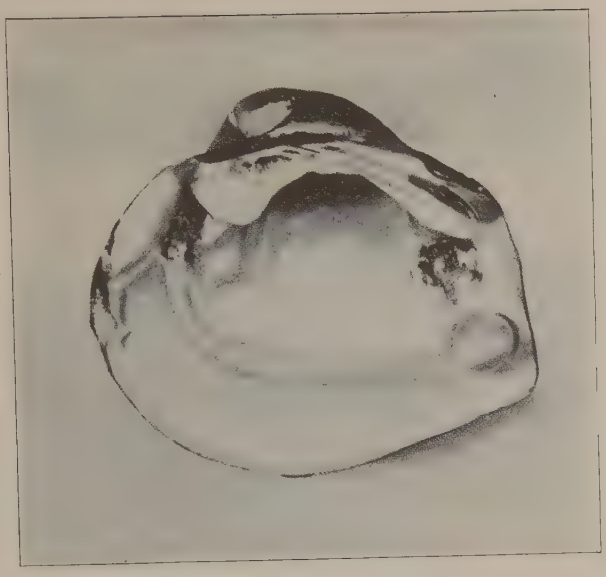
The pear may be propagated by grafting on the quince, white thorn, and other trees, and is usually budded or grafted on seedlings of a species of pear called free stocks. A species known as the Bartlett pear is the favorite variety in the American market. It is luscious, yields abundantly, and is of large size. Next to it is the Seckel pear. The Bartlett constitutes fully ninety per cent. of all the pears grown in the United States. The cultivation of pears extends to practically every country within the tropical and temperate zones. California produces large quanties of excellent size, and next to it the state of New York takes rank. Other states producing large quantities include Ohio, Michigan, Indiana, and Pennsylvania. The pear crop of the United States aggregates about 5,500,000 bushels annually. Pears are picked before quite ripe, wrapped in separate papers, and transported in refrigerator cars. Large quantities are eaten fresh or canned for table use. In some regions pears are dried similarly to apples and peaches. They are used in the manufacture of wine and a pear cider known generally as perry. Pear cider is made in large quantities in France and other countries of western Europe.

PEARL, a calcareous secretion formed chiefly of calcium carbonate, and found as a morbid deposit around a central nucleus within the shells of various mollusks, especially those of pearl-oysters and river mussels. Pearl-oysters occur in beds similar to those of the common oyster. Their shell is rough and greenish on the outside, and on the inside is a coating composed of nacre, or mother-of-pearl. Pearls of the same material as mother-of-pearl occur both in the flesh of the oyster and as attached particles on the outside, often from ten to twenty different pearls being found in one oyster. It is thought that the pearl originates from some foreign substance like sand getting into the shell or oyster, and around this the hard, pearly growth forms. The Chinese have developed a system of cultivating pearls by placing small beads and other hard substances in living pearl-oysters and replacing them in the sea, where they remain until pearls are sufficiently developed, when they are caught and the developed product is secured.



INSIDE VIEW OF PEARL-OYSTER SHELL.

The most valuable pearl fisheries are those of Ceylon and the Persian Gulf, where



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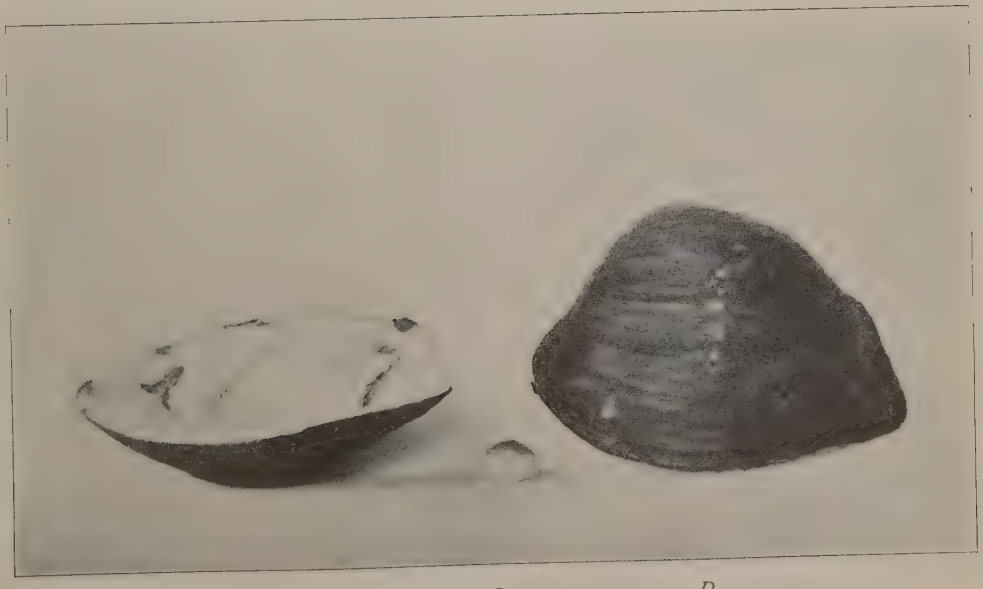


(Opp. 1386) B C. D.

SALMON-COLORED PEARL FOUND AT LINN JUNCTION, IOWA.

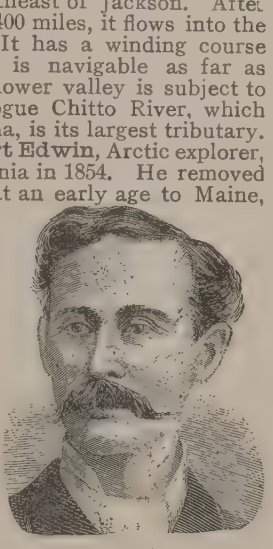
A. Interior view of the right valve, showing pearl in place.
B. The same valve with the pearl removed.
C. The pearl when taken out.
D. Exterior view of the left valve, showing protuberance corresponding to the pearl.

the industry has been carried on from remote antiquity. Pearl fisheries of much value exist in the Gulf of Manaar, on the northeastern coast of Ceylon, where the shells of mollusks measure from nine to twelve inches in diameter, though in the pearl fisheries of California and the Gulf of California the shells are somewhat thicker. Pearl fishing on the Asiatic coast continues only about a month each year, and usually begins in March. Divers descend to a depth of from sixty to eighty feet, where they loosen the oysters and are pulled up in from forty to sixty minutes, though in rare cases they are able to remain under water seventy-five minutes. The diver is aided in sinking by a weight of about thirty pounds being attached to his feet, and when he has gathered a number of oysters into a net, he is pulled up by means of a rope. Boats receive the oysters at the surface and carry them to the shore, where they are piled in the sun and allowed to decompose. When sufficiently rotted, they are carefully washed and examined for the pearls, and those attached within the shell are removed by means of a hammer. Pearl-oysters occur over extensive areas of the Pacific Ocean, including the coasts of Borneo, the Sulu Islands, Australia, and the Bay of Panama. Pearls are also secured in the Gulf of Mexico, and in many of the rivers of the United States, Canada, Russia, Germany, Britain, and other European countries.

Pearls are more or less dependent on their size, form, and structure for commercial value, and are separated into various classes. The smaller are called seed pearls, and are sold in the market by weight, while the larger ones are sold with reference to their composition and color. Those of a rose tint are counted the most valuable in some countries, though others prefer the yellow. Pink pearls are valuable on account of their rarity, but the highest price is paid for black pearls, which are the most rare, and are found only in several kinds of shells. The principal uses of pearls include decoration, ornament, and trimming for inlaid work. Mother-of-pearl is used in making the handles of knives and forks and for buttons. Within recent years considerable progress has been made in the manufacture of artificial pearls, particularly in Italy, Germany, and France. The imitations consist of blowing very thin beads of glass and finishing them with the scales of certain fishes, as the dace and bleak. Julius Cæsar possessed a large number of pearls, many of which he brought from the streams of Britain, and in one instance paid $240,000 for a fine specimen. It is reputed that Cleopatra dissolved a pearl valued at $350,000 in vinegar and drank it, while another was cut under her direction into earrings for the statue of Venus in Rome. The most valuable pearl now in existence is owned by the shah of Persia.

PEARL RIVER, a river having its source in Neshoba county, Mississippi, about one hundred miles northeast of Jackson. After a course of about 400 miles, it flows into the Gulf of Mexico. It has a winding course toward the south, is navigable as far as Jackson, and the lower valley is subject to overflow. The Bogue Chitto River, which joins it in Louisiana, is its largest tributary.

PEARY, Robert Edwin, Arctic explorer, born in Pennsylvania in 1854. He removed with his parents at an early age to Maine, where he attended school, and afterward graduated at Bowdoin College. In 1885 he became a civil engineer in the United States navy, and made expeditions toward the north pole in 1886, in 1891, and in 1893. From the latter expedition he returned Sept. 21, 1895, to St. Johns, Newfoundland, in the steamer Kite, which had sailed for the relief of his company. He made a successful expedition to Greenland in 1896. He published several interesting reports of his voyages, especially of the expedition made in 1901-02, when he reached 84 degrees 17 minutes north latitude, northwest of Cape Hecla.



R. E. PEARY.

PEASANTS' WAR, an insurrectionary movement in Germany, which was instituted by the peasants for the purpose of securing relief from the extravagant taxes and oppression of the nobles. The movement was organized in the south of Germany in 1476, and by 1525 it had spread over all that country. Some of the nobles regarded the movement with favor, since it was at least partially directed against the clergy, who had become both oppressive and sensual. In several instances the peasants secured success. They were supported by the towns of Frankfurt, Muhlhausen, Fulda, and others, but the lack of systematic coöperation made it impossible for the enterprise ultimately to succeed. Among the principal demands were the abolition of serfdom; free election of their parish clergy; support of the poor; equality in the administration of justice; abolition of clerical exactions, and the restoration of titles to certain forests and land. The peasants were defeated with vast losses in South Germany in the early part of 1525, and Philip of Hesse defeated them in several engagements in the North. The movement was unfortunate for the peasants in that they were reckless in the destruction of castles, convents, and churches, which they pillaged, and they also committed other excesses. After they were finally quashed,

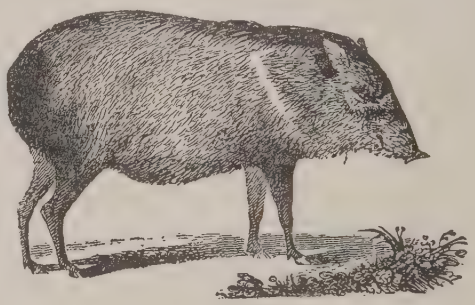
their burdens became even greater than before, and many of their leaders were executed. In this conflict for human rights fully 150,000 persons suffered death.

PEAT (pēt), a substance resulting from the decomposition of various plants in the presence of moisture, and found chiefly in bogs and marshes. It is confined principally to the colder countries, since decomposition takes place too rapidly in the warmer climates to form peat. At the surface it contains considerable water, and becomes gradually more compressed toward greater depths until it approaches the condition of lignite. In the high latitudes it is formed of various species of bog-moss. These forms of vegetation produce peat below, while at the surface new shoots grow up to take the place of the decaying parts. Recently-formed peat has a brownish hue and a soft consistency, while the older is quite dark in color. Extensive peat-bogs often have a depth of fifty feet, and when the product is taken from the deposits it contains about eighty per cent. of water. The peat is cut by implements in rectangular forms and placed on an elevated surface to dry. When sufficiently dry it is used for fuel, giving out a constant heat with little smoke. Peat of ordinary consistency contains fifty-six per cent. of carbon, six per cent. of hydrogen, and thirty-eight per cent. of oxygen and nitrogen. It occurs extensively in northern Europe, particularly in Russia, Britain, and Germany; in New England, Canada, and other high latitudes, where it is used extensively for fuel. Within late years various machines have been invented to compress peat artificially to free it from water, though formerly moisture was removed exclusively by a slow drying process. Peat can be burned in furnaces, ranges, stoves, and open grates, and is employed both for heating and cooking. Dense peat gives the best results when burned upon a grate, and the fibrous kind is best for use in stoves and open fireplaces without a grate.

PEBBLE, a fragment of rock ranging in size between a grain and a cobble, and having a rounded form due to the action of water, ice, or wind. Pebbles are found in abundance among the deposits of all geological periods, but in most cases they are held together by lime, silica, or iron, thus forming large stones. Pebbles formed of rock crystal and agate occur in many regions, and possess value in the manufacture of optical supplies and jewelry.

PECAN (pē-kăn′), a variety of hickory common to North America. It is noted for its fruit, which is the most palatable of all the hickory-nuts. The tree attains a height of sixty to seventy feet, has a straight trunk, and bears leaves with thirteen to fifteen leaflets. The wood is of little use aside from fuel, but the nut is raised extensively for the market. It thrives in Arkansas, Mississippi, Illinois, and neighboring states. Large quantities of the nuts are exported to the markets of Europe.

PECCARY (pĕk′kȧ-rў), a genus of animals allied to the swine, and found extensively in South America and the southern parts of North America. There are two well known species, the white-lipped and the collared peccary. The former is confined principally to the region between Mexico and Paraguay where large droves are often met



PECCARY.

with; while the latter ranges from Patagonia to Arkansas in small packs. The white-lipped peccary has been successfully domesticated. It never produces more than two young at a birth. It has tender, agreeable flesh, which is less fat than that of swine. The peccary feeds on potatoes, maize, sugar-cane, and other vegetable forms. Both species have curved tusks and a dorsal organ secreting an oily, musky substance. The latter must be removed immediately after the animal is slaughtered, since it otherwise conveys a peculiar scent to the flesh.

PECOS (pā′kōs), a river of the United States, which rises a short distance east of Santa Fe, New Mexico, and after a course of about 800 miles toward the southeast joins the Rio Grande at Painted Cave, Texas. It has a number of tributaries both in New Mexico and Texas, but in the summer season little water flows in its channel.

PEDEE, Great and **Little**. See **Great Pedee**.

PEDOMETER (pē-dŏm′ē-tēr), or **Odometer**, an instrument in the form of a watch, which is used to measure distances passed over in traveling. A small pedometer, containing a train of wheels in a small case and registering on a dial the number of impulses from a cord attached to the foot, is worn by persons walking. In this form it measures the number of paces traveled. An instrument of similar construction is attached to the wheel of a carriage or bicycle to indicate distance. The Romans attached pedometers to the wheels of carriages and chariots.

PEDRO I., emperor of Brazil, born in Lisbon, Portugal, Oct. 12, 1798; died there Sept. 24, 1834. He was the second son of John VI. of Portugal, became prince of Beja in 1801, and when his father ascended the

throne of Portugal and Brazil, in 1816, he was titled prince of Brazil. In 1807 the royal family fled to Brazil, where he secured his education, and in 1821 became regent of Brazil. The Brazilian people demanded a liberal constitution, and threatened to depose Dom Pedro, but the latter sided with them for a more liberal government and was accordingly elected governor in 1822. At the death of his father, in 1826, he was made king of Portugal, which dignity he held only a short time before resigning in favor of his daughter, Maria II. A revolution in 1831 compelled him to resign in favor of Dom Pedro II., then only about six years old, and shortly after he sailed to Portugal, where he assisted in protecting the interests of his daughter. He was excommunicated by the pope, in 1833, for confiscating monastic property in Portugal.

PEDRO II., emperor of Brazil, son of Pedro I., born in Rio de Janeiro, Brazil, Dec. 2, 1825; died in Paris, France, Dec. 5, 1891. His father abdicated in his favor on April 7, 1831, when he was proclaimed emperor. The government was first administered by a regency council, later by one regent, and the chambers proclaimed him of age on Jan. 23, 1840, when he assumed sovereign power. He married Princess Theresa, sister of Francis I. of Naples, in 1843. He formed an alliance with Argentina and Uruguay against Paraguay in 1865, and a state of war existed till March 1, 1870, when the forces of Paraguay under President Lopez were annihilated and the latter died. In 1871 he made an extended tour of Europe, visiting the leading cities, and in 1876 visited various sections of the United States. An imperial decree issued in 1871 provided for the ultimate abolition of slavery, and he was likewise advanced in educational and industrial reforms, giving encouragement to the establishment of schools, railroads, and commercial development. A revolution on Nov. 15, 1889, terminated the empire and instituted the republic, when Dom Pedro left the country.

PEDRO THE CRUEL, king of Castile and Leon, born in Burgos, Spain, Aug. 30, 1334; slain March 14, 1369. He was the son of Alfonso XI., who was killed at Gibraltar on March 30, 1350, when the son succeeded him. He was married to Blanche de Bourbon, sister of the king of France, in 1353, but soon after divorced her for Dona Maria Padilla, who had previously been his mistress. His reign was one of great cruelty, and witnessed the death of his principal opponents and two of his brothers, which at length caused the people to raise a rebellion and depose him for his half-brother, Henry of Trastamere. The latter was defeated by an army under Pedro and retired to France, but in 1366 he returned with a large army to take possession of the throne. Pedro in the meantime had secured the assistance of Edward, the Black Prince of England, and on April 13, 1367, defeated Henry at Navarrete. Great cruelties were inflicted upon those surviving, and the English allies withdrew. Henry, in the meantime, obtained material assistance from the French and again invaded the country. His entrance was generally hailed with delight by the people, and on March 14, 1369, a battle ensued at Montiel, in which Pedro was defeated and made prisoner. Immediately after the battle a combat ensued between the two leaders, which resulted in the death of Pedro. Henry succeeded him with the title of Henry II.

PEEKSKILL (pēks'kĭl), a city of New York, in Westchester county, on the Hudson River, forty-three miles north of New York City. It is conveniently connected with other cities by railroads, and has excellent municipal facilities, including electric lights, pavements, and electric street railways. Among the manufactures are flour, machinery, ironware, stoves, cigars, electrical appliances, and clothing. It is the seat of a military academy, St. Gabriel's School, several charitable institutions, and a public library. Its notable buildings include several fine schools and churches. Population, 1900, 10,358.

PEEL, Sir Robert, statesman, born near Bury, Lancashire, England, Feb. 5, 1788; died July 2, 1850. He was the son of Sir Robert Peel, a cotton spinner and baronet, graduated at Oxford in 1808, and the following year entered parliament as a tory. Peel was an influential member of parliament for more than forty years, where he became distinguished for his prudence and ability. He was made under-secretary of state for the colonies in 1810, served as secretary for Ireland in 1812-18, and in 1822 became home secretary under the Liverpool ministry. Up to that time Roman Catholics had been barred from many government positions, but when he entered the Wellington cabinet, in 1829, he favored the Catholic emancipation act, a bill to establish general equality. This course caused him to lose the friendship of the tories, and in 1830 the ministry under Earl Grey succeeded that of Wellington. This ministry was committed to parliamentary reform, a policy Peel vigorously opposed, but the reform bill passed in 1832. He was reëlected in the latter year for Tamworth, which he represented in parliament until his death.

Peel was selected as prime minister in 1834, but his party was in the minority, and the following year he gave up the place to Melbourne. In 1841 his party secured a large majority in the general election, when he again became prime minister, and soon after the banking act was passed. A famine in Ireland brought the repeal of the corn laws forward as a prominent issue in 1845, and the strong demand for cheap corn caused him to favor that act. He retired from an official position in the parliament in 1846, and

afterward acted with the whigs, who were the advocates of free trade. Queen Victoria offered him the peerage, but this he declined, and also the Order of the Garter. His death resulted from an accidental fall from his horse in Hyde Park.

PEGASUS (pĕg'ă-sŭs), according to Greek legend, a beautiful winged horse that sprang from the body of Medusa when she was slain by the hero Perseus. It is stated that he immediately flew to the top of Mount Olympus, where he was employed by Zeus to convey thunder and lightning through the heavens, and later he carried Bellerophon in his fight against Chimæra. In later times Pegasus served the Muses, and represented the poetical inspiration that tends to develop man's higher nature and causes the mind to soar heavenward. He was regarded the author of the sacred fount Hippocrene, which he produced by stamping with his heel near the summit of Mount Helicon, whence the Muses obtained their richest draughts of inspiration. Some writers assert that he was bridled by Bellerophon with a golden bridle received from Minerva.

PEIXOTO, Floriano, statesman, born in Alagoas, Brazil, in 1842; died June 29, 1895. He secured a military education at Copacabana. Shortly after he entered the army of Brazil, and served through the war with Paraguay in 1865-70. At the battle of Aquidaban, March 1, 1870, he was severely wounded, and shortly after resigned to superintend his estate, but after his slaves were liberated he again entered military service. In 1890 he became a minister of war in the republic. The following year he was elected vice-president of Brazil, and, when President Fonseca resigned, on Nov. 23, 1890, he became president. His administration was efficient, and he was succeeded by Prudente de Moraes.

PEKIN (pē'kĭn), a city in Illinois, county seat of Tazewell county, on the Illinois River, fifty-five miles north of Springfield. It is connected with other cities by a number of extensive railroad lines, is surrounded by a fertile country, and has a number of excellent school and church buildings. Among the manufactures are spirituous liquors, flour, hardware, soda water, marble products, carriages, cigars, and machinery. The improvements include electric lights, pavements, waterworks, and street railways. It has a fine courthouse and a growing trade in merchandise. Population, 1900, 8,420.

PEKING (pē-kĭng'), or **Pekin,** the capital of the Chinese Empire, located in the province of Pe-chi-li, one hundred miles northwest of the Gulf of Pe-chi-li. Its site is in the center of a sandy plain, about sixty miles south of the great Chinese wall. It is surrounded by walls built of brick and stone laid in cement. There are properly two parts, the northern and southern. The northern part forms the Tartar city. It is surrounded by a wall sixty feet high, fifty feet wide at the base, and forty feet at the top. The southern part is the Chinese city, and is inclosed by a wall thirty feet high, twenty-five feet wide at the base, and twelve feet at the top. It is estimated that the walls surrounding the outer city and suburbs are about thirty miles in length, and they are so constructed that fully twenty-five square miles are enclosed by them. Sixteen gates are provided for entrance into the city, and each is protected by an enceinte and an imposing tower. Within the northern part is the Prohibited City, known as the Kinching, where the palace of the emperor and the buildings of the principal officers are located. This section includes the Tranquil Palace of Heaven, in which the emperor resides. Within its confines are the Palace of Earth's Repose, and the residence of the empress. Beautiful gardens, magnificent groves, and artificial lakes are in this vicinity. It is at once a place of security and beauty.

The legations of foreign countries, among them those of the United States, France, Germany, Russia, and Britain, are located in the Tartar city proper. In 1900 the German minister, Baron von Ketteler, was murdered in that portion of the city, and there the United States minister, E. H. Conger, was held captive in 1900 until liberated by the allied forces of the United States and European nations. Peking has many excellent temples and public buildings. The most important structures include the Temple of Agriculture, the Mohammedan mosque, the Temple of Eternal Peace, the Imperial Library, the Temple of Heaven, the Grand National College, the Observatory, and the Chinese Medical College. The city has many elementary schools, colleges, and places of worship. As a whole its trade is limited and the manufactures are not extensive. The store buildings are open in front, and so built that the customers stand on the street when making purchases. Few pavements are in the city, though telephone and telegraph connections are abundant, and a railroad line connects the city with the Gulf of Pe-chi-li and several other important points. Many of the citizens are extremely poor. Residences are not uncommonly mixed with factories, public offices, and temples, and the sanitary regulations in many parts are greatly neglected.

Peking was the capital of the kingdom of Yen many centuries before the Christian era, but when the Tsin dynasty overthrew the kingdom, in 222 B. C., it ceased to be the seat of government. The Kitan dynasty restored it as the capital in 938 A. D., but Genghis Khan captured it in 1215, though with the conquest of the Mongols, about 1280, it became second to Nanking, and that city was made the capital. Yung-Lo, the third emperor of the Ming dynasty, removed the court to Peking in 1421, and since then it has continued to be the capital. The allied

army of the French and English in 1860 invaded China, and in that year secured from the emperor the treaty of Tien-tsin. Subsequently other treaties were concluded whereby legations are allowed to reside in the city, but they are forbidden entrance into the Prohibited City. In 1900 Peking was the scene of vast military disturbances, and was occupied by the allied armies of the United States, Germany, Russia, England, and France under General Waldersee. Population, 900,000.

PELAGIUS (pee-lā'jĭ-ŭs), founder of the Pelagian religious system, born in Britain about the middle of the 4th century. It is thought that he was of Welsh origin, studied for holy orders, and later became a monk. He was at first in high repute for genius, learning, and piety, and about the year 400 went to Rome for the purpose of advocating his views in regard to original sin, and with the design of reforming the clergy and laity. His views were opposed by St. Augustine, but they were supported by Celestius and many others. Among the tenets of Pelagianism regarding original sin are the following: The denial of original sin and, consequently, of its remission in baptism; the denial of the necessity of grace; the assertion of complete free will; the possibility of a perfectly sinless man; the existence of a middle state for infants dying unbaptized; the view that Adam's fall injured himself only and not his posterity; and the tenet that neither death nor sin passed upon all men by the fall of Adam, since he was created mortal and would have died, even if he had never sinned. The controversy resulting from the views held by Pelagius and Celestius led to various discussions and canons. Pelagius was accused of heresy before the synod of Jerusalem, in 415, but a synod of fifteen bishops acquitted him, while a council of 214 bishops, held in Carthage, condemned his doctrines in nine canons. Celestius was banished from Rome by the emperor in 415. He was condemned by a synod at Rome in 430, and again by the council of Ephesus in 431. It is not known when the death of Pelagius occurred. Some contend that he died in Britain, while others think his death occurred in Palestine. Pelagianism long had a foothold in the church, but the followers of Pelagius never formed a distinct sect.

PELASGIANS (pĕ-lăs'gĭ-ănz), the ancient and widely distributed tribe of prehistoric people regarded the ancestors of the Greeks, and of the earliest civilized inhabitants of Asia Minor and Italy. It is not known where or how these people originated, but most writers agree that Arcadia was one of their principal seats, where they prospered for many centuries. Many Greek writers, including Homer, Herodotus, and Æschylus, speak of them as the Pelasgi and regard them the inhabitants of Greece at a very early period, though Strabo and several others speak of them only as a branch of the early Hellenic inhabitants. Some historians assert that they were a powerful people even before the 15th century B. C., when they were in possession of the north coast of the Mediterranean. Later they formed an alliance with the Lydians and Achæans, and in the reign of Rameses I. conquered a portion of Lower Egypt.

PELEW ISLANDS (pĕ-lū), a group of islands in the North Pacific Ocean. They are located about 425 miles east of the Philippines, and belong to the Caroline Archipelago. The group includes about twenty-five different inhabitable islands, most of which have a rich and fertile soil, an abundance of water, and excellent fisheries. There is a generally mountainous interior and coral formations encircle them. The climate is healthful and quite favorable to Europeans. Among the productions are cocoanuts, sugar cane, tropical forest trees, cattle, goats, fowls, agricultural products, and many varieties of fruits. The population consists principally of Polynesians, but several European settlements are maintained, the most flourishing being at Tomil Harbor. Spanish navigators explored the group in 1543, and in 1899 they and all the Carolines, except Guam, were bought by Germany, to which country they now belong. Population, 6,890.

PELICAN (pĕl'ĭ-*kan*), a genus of web-footed water birds remarkable for their broad bill with a pouch under it. The bill is flattened, nearly straight, and very long. At the end of the upper mandible is a hook curving over the tip of the lower one. In size the bird is about as large as the swan, and the feathers are hair-like. The pouch is underneath the lower mandible. It consists of naked skin, and serves for the temporary storage of food, thus making it possible to preserve a quantity for future wants. Pelicans are swift in swimming and in flight, and hover over their prey until they can catch it by swooping down unawares. Several species of pelicans are native to the United States, among them the white pelican. It is about six feet long, has an expanse of wing of about nine feet, and weighs eighteen pounds. The brown pelican is found on the coasts of the Gulf of Mexico

PELICAN.

and the Caribbean Sea, and there are several other species found in Eurasia and Africa. They live along the shores of streams and the seacoast, where they feed on fish and other aquatic animals. Their nests are built close to the shore, usually in rushes, where they feed the young from the pouch. The ancients had a tradition that the young are fed with blood from the breast, and a number of excellent fables have been written on account of it. Pelicans can be domesticated successfully. Negroes and Indians regard their flesh valuable food, but it is rank and has a fishy taste, and is not eaten by the whites.

PELISSIER (pă-le-se-ā′), **Amable Jean Jacques**, noted soldier, born at Maromme, near Rouen, France, Nov. 6, 1794; died in Algiers, May 22, 1864. He was the son of a farmer, studied in the Lyceum at Brussels, and in 1814 entered the French military college, but in the same year became connected with the royal guard. He served consecutively in Spain and Algeria, and in 1850 was made general of division. In 1855 he commanded the first corps in the Crimean War, but soon after succeeded Marshal Canrobert as chief commander. For distinguished services at Malakoff, the stategic point leading to the fall of Sebastopol, he was made duke of Malakoff and senator, and received a donation of $20,000. In 1858 he was ambassador to London, and in the following year was appointed governor-general of Algeria.

PELOPONNESUS (pĕl-ō-pŏn-nē′sŭs), the peninsula forming the southern part of Greece, now called the Morea, and so named from King Pelops, who established a Grecian colony there. The peninsula is connected with northern Greece by the Isthmus of Corinth, a narrow neck of land lying between the Saronic Gulf and the Gulf of Corinth. It is about 140 miles from north to south, has an area of 8,975 square miles, and formerly contained a population of 2,000,000, though at present the inhabitants number only about one-seventh of that number. The principal cities of ancient times were Argos, Mycenæ, and Sparta, and in 431-404 B. C. it was the seat of the Peloponnesian War. Anciently it was divided into six states: Laconia, Sparta, Messenia, Arcadia, Elis, and Argolis. Some writers add a seventh state, Sicyon. A part of the region was conquered by the Turks in the 15th century, and subsequently it was a possession of the Venetians. In 1821 it was the scene of several battles in the Greek war of independence.

PELOPS, an important personage of Greek legend, son of the cruel Tantalus, brother of Niobe, and grandson of Zeus. Pelops is described as a pious and virtuous prince. After his father was banished to Tartarus, he entered upon a war against the king of Troy, in which Pelops was defeated and forced to flee. Soon after he emigrated to Greece, where he married Hippodamia, daughter of the king of Elis, and succeeded his father-in-law on the throne. His reign in Pisa is described as one of much splendor, and his colonies in southern Greece caused that region to be called Peloponnesus. He was the father of a number of celebrated Grecians, of whom Thyestes and Atreus are particularly noteworthy. Many of the myths mention him, and he was honored with particular regard at Olympia for having revived the Olympic games. A sanctuary was dedicated to him at Olympia, in the grove Attis.

PELOTAS, a city of southern Brazil, situated in the state of Rio Grande do Sul, on Lake Patos. It is surrounded by a productive stock country and is the seat of a large meat-curing industry. There are railroad connections with interior towns and seaport cities, and a large market in tallow, bones, hides, horns, merchandise, and utensils. The streets are regularly platted and intersect each other at right angles, and the city is one of the wealthiest and most beautiful in Brazil. Population, 47,520.

FOUNTAIN PEN.

PEMMICAN (pĕm′mĭ-kan), an article of food originally made of buffalo meat by the American Indians. They cut the lean meat into strips, and after drying it in the sun or wind, it was pounded into a paste and tightly pressed to form cakes, which they sometimes flavored with the juice of the June-berry. A somewhat similar food is now made from beef and dried fruit. It possesses a large per cent. of nourishment in small space, and keeps well for a long time. This class of food is used on long voyages or explorations.

PEN, an instrument for writing with a fluid ink, usually made of metal and fitted to a holder. The ancients used pens made from reeds for writing on papyrus or parchment, and reed-pens are still in use among the people of Persia and other countries of western Asia. A pointed stylus of metal, bone, or other material was employed in early times for writing on wood or stone. The peoples using characters like those employed by the Chinese and Japanese write with a hair pencil or brush. With the manufacture of paper suitable for writing pens came into general use, but they were orig-

inally made from quills, mostly those of the goose, turkey, swan, crow, and ostrich. The best quill pens are obtained from quills taken principally from the wings of the goose, and in many sections of Eurasia pens of this kind are still used extensively. The quills are at first soft and tough, but they are prepared for use by a process of heating and dipping in alum water, after which they are cut for use with a pen-cutter's knife.

Steel pens are now in general use among the people of America and Europe, and most of the more highly civilized countries. They were first manufactured in the early part of the 19th century, and originally were made to resemble the quill pen, forming a barrel of very thin steel, being cut and slit in the manner of a quill. The principal fault was their hardness, which caused them to scratch the paper in a disagreeable manner. In 1820 Joseph Gillott introduced marked improvements in the manufacture of pens, by which he was able to make them of much thinner sheets of steel and thus render them more elastic, while at the same time giving them higher finish and temper. His factory at Manchester, England, became an important seat of pen-making, and the price was so materially reduced that in 1821 one thousand pens could be purchased at the price of a single pen made by manufacturers at the same place in 1803. Other improvements in pen manufacture speedily followed, and within a very short time steel pens came into general use. The process of manufacturing involves a variety of operations, including the rolling of the best quality of cast-steel into sheets, cutting them into flat pieces called blanks, and afterward stamping and embossing them. An emery wheel is used to finish the nibs or points, after which the slit is cut, and the pens are glazed with a varnish and boxed for the market.

Gold pens are more expensive than those made of steel, but by exercising care they serve a useful purpose for many years. The nibs of gold pens are made by tipping them with iridium, one of the hardest of metals, after which they are ground down on an emery wheel and polished. Fountain pens, having a reservoir by which the ink feeds by gravity to the point, were invented by Joseph Bramah, and are used extensively by persons desiring to have writing material at hand for various purposes at any time. Pen-making is an important industry in the United States. There are extensive manufactures by which millions of pens are made annually for home use and for exportation. The principal manufactories are located in Camden, Philadelphia, Meriden, and New York City. At present the pen manufactories of England are the most important in Europe, though Germany, France, Sweden, and a number of other countries produce large quantities. The Gillott pens and several others of European make are sold quite extensively in the American market.

PENANG (pē-năng'), or **Prince of Wales Island**, an island belonging to Great Britain, situated near the west coast of the Malay Peninsula, in the Strait of Malacca. It is about thirteen miles long, seven miles wide, and has an area of 106 square miles. The surface is partly mountainous, but consists in part of fertile plains. It is well watered and has a favorable climate. Among the principal productions are coffee, rice, pepper, tapioca, nutmegs, cocoanuts, cloves, sugar, and various tropical fruits. Minerals are found in the mountains, especially tin ore. In all parts of the island are valuable forests. Georgetown, a city of 44,500 inhabitants, is the capital and principal seaport. The inhabitants consist mostly of Chinese, Malays, and Burmans. Mohammedanism is the chief religion, but there are considerable numbers of Christians. Population, 92,650.

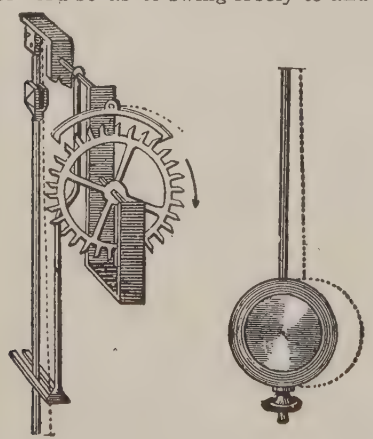
PENCIL, an instrument used for writing, drawing, marking, and painting. It is usually made of a slender casing of wood enclosing a thin strip of graphite, colored chalk, or other material; or of a relatively large piece of graphite, slate, or chalk without a casing. The name is frequently applied to a small brush of hair used by painters in laying on their colors, the hairs used being mostly those of the badger, camel, mink, and goat, and the bristles of hogs. Originally pencils consisted of chalk and other material cut to be held in the hand, but later pencils similar to the black-lead instrument now used extensively were invented. The first allusion to a pencil formed of wood and lead occurs in a treatise on fossils by Conrad Gesner, of Switzerland, bearing date in 1565. Pure lead was used in writing for some time, but, as this makes only a light mark on paper, it was soon displaced by the discovery of graphite or plumbago, which is now employed in the manufacture of the common black-lead pencils in general use. The wooden casing is usually made of cedar, though higher grades of pencils are made of other varieties.

The casing of lead pencils consists of two slips of unequal thickness, the thicker one having a groove in which the lead fits perfectly, and the thinner one being glued on to cover the lead, and afterward the pencil is rounded in a revolving cutting machine. Pencils of an inferior quality are made of a mixture of sulphur and the dust of graphite, and this mixture is softened by the addition of a little tallow. Colored pencils are made of a mixture of clay with mineral coloring matter, and indelible and copying pencils from clay and gum colored with an aniline preparation. Slate pencils are cut out of thin strips of slate and afterward rounded by a cutting machine, or are made by encasing thin strips of slate in wood. The largest manufactories of lead pencils in the world are situated at Nuremberg, Germany, where extensive deposits of graphite occur. The

first manufactory for making lead pencils in the United States was established in New York City by M. L. Leman in 1830. In 1849 A. W. Faber, of Stein, Germany, established an agency in New York, and in 1881 founded a large manufactory in the same city, from which the industry in this country dates. Usually pencils are numbered according to the degree of hardness, as 1, 2, 3, 4, etc., the larger numbers representing those having harder lead than No. 1. In some cases letters are employed for the same purpose.

PENDLETON (pĕn'd'l-tŏn), **George Hunt**, statesman, born in Cincinnati, Ohio, July 25, 1825; died in Brussels, Belgium, Nov. 24, 1889. After receiving an education and being admitted to the bar, he established a law practice in Cincinnati, and served in the state senate in 1854-55. He was elected to congress as a democrat in 1856, serving in that capacity until 1865. The same party nominated him for vice-president with George B. McClellan in 1864. He was a United States senator from Ohio in 1879-85, and in the latter year was appointed as minister to Germany by President Cleveland. Pendleton was an able advocate of civil service reform, and was chairman of a committee that proposed an act having that policy as its object.

PENDULUM (pĕn'dŭ-lŭm), a body suspended or supported from a fixed point by a rod or cord so as to swing freely to and fro.



PENDULUM.

The path through which it passes is called the arc, its movements to and fro are termed vibrations or oscillations, and the extent to which it goes in either direction from the lowest point is styled its amplitude. Vibrations performed in equal times are termed isochronous. A pendulum once set in motion would continue to move forever in the same arc if it were not impeded by the friction of the air and other agencies, since it acquires sufficient force while moving downward the first half of the circular path to raise it to the same height on the opposite side. The three laws of the pendulum may be briefly stated as follows: 1. In the same pendulum, all vibrations of small amplitude are isochronous. 2. The times of the vibrations of different pendulums are proportional to the square root of their respective lengths. 3. The time of the vibration of the same pendulum varies at different places.

The first law was discovered by Galileo in watching the motions of a lamp swinging at the end of a long chain suspended from the cathedral roof at Pisa, where he observed that the oscillations were always equal in duration, and, when the arc of the circle became shorter, the movements were correspondingly slower. The resistance which the air offers causes the pendulum to swing through smaller and smaller arcs until it comes to rest, unless it is connected with a spring or weight. According to the second law, a pendulum one-ninth the length of another will vibrate three times as fast. Thus, a pendulum which vibrates seconds must be four times as long as one which vibrates half seconds. Heat lengthens and cold contracts the rod of a pendulum, if it be of a single metal, as steel or iron. These effects are neutralized by compensation pendulums, the two classes being known as mercurial and gridiron.

A mercurial pendulum has a vessel containing mercury at the lower end, and this is so adjusted that when the pendulum is expanded downward by the heat, the mercury ascends in its enclosure, and when the pendulum is contracted by cold it descends correspondingly. The gridiron pendulum has bars of iron and brass to work against each other, the contraction or expansion of certain rods being overcome by that in the others. Clocks not provided with compensation pendulums have a screw below the bob, by which the length of the pendulum may be regulated according to the temperature at different times of the year, while others have a pendulum of wood, which is less liable to expansion and contraction than metal. The third law of the pendulum was discovered by observing the vibrations of a pendulum at different latitudes. At the equator a pendulum vibrates most slowly, this being due to the fact that the vibrations are directly proportional to the force of gravity at the place. The length of a pendulum vibrating seconds at sea-level at the equator must measure 39.02 inches; at New York, 39.10; at London, 39.13; and at Spitzbergen, 39.21. See **Escapement**.

PENELOPE (pē-nĕl'ŏ-pē), in Greek legend, the wife of Ulysses (Odysseus), and mother of Telemachus. The husband had gone to the Trojan War during the infancy of the latter, and while he was absent Penelope was harassed by the importunities of numerous suitors, who had taken possession of his home and devoured his substance. Penelope deferred giving answer until she could weave a robe for the aged Laertes, but

in order to gain time secretly undid at night what she had done in the day. In this way it was possible for her to retard the completion of the work, but her strategem was discovered by an angry suitor just as Ulysses came back to Ithaca, and he promptly slew those who had so improperly invaded his home.

PENGUIN (pĕn'gwĭn), a genus of web-footed birds native to the southern hemisphere. They have short wings useless in

PENGUIN.

flight, feet adapted for an erect position of the body, legs far behind, and the body is covered with short, rigid feathers. A large number of species have been described, the principal ones being known as the rockhopper, king-penguin, and jackass-penguin. Most of the species measure about two feet when standing erect, have completely webbed toes, and are remarkably skilled in swimming and diving, their rudimentary wings facilitating the rapidity of movement. They are found most abundantly in the high latitudes, where they congregate in large flocks on rocky islands and coasts to breed. Navigators have frequently observed from 25,000 to 30,000, of these birds congregated together. They are described as stupid when approached, but show some courage when actually attacked. The young are edible. Penguins feed on cuttlefish and other marine animals, and many species are noted for their bright plumage. These birds are remarkable for incubating their eggs by keeping them close between the thighs. The female becomes very fat during incubation, subsisting on food gathered for it by the male.

PENINSULAR WAR, the name generally applied to a war waged by Napoleon for the conquest of Spain and Portugal. It was brought on largely by a disagreement between Charles IV., king of Spain, and his son Ferdinand, in 1807, which Napoleon made the occasion of interference. Accordingly he placed his brother Joseph on the throne of Spain, who was proclaimed king on July 24, 1808. The royal family of Portugal had previously fled to Brazil, but the people of both Portugal and Spain rose against the French in all parts of the peninsula. Napoleon had stationed French troops in many towns of the peninsula, and the people at first carried on a guerilla warfare, but on July 12, 1808, a British army of 30,000 men was sent under Sir Arthur Wellesley, afterward duke of Wellington, to aid in expelling the French. He landed at Figueras, Portugal, and on Aug. 21 defeated the French under General Junot at Vimiera. Wellesley was superseded in the command by Sir Harry Burrard, who soon after was superseded by Sir H. Dalrymple, and the latter on Aug. 30 concluded the treaty of Cintra, by which Junot agreed to evacuate the country. However, Napoleon sent large reënforcements to Spain and came in person to Madrid to direct his army. At that time Sir John Moore commanded the forces in Spain, and on Jan. 16, 1809, lost his life in the battle of Corunna. Shortly after Wellesley returned to take command of an army made up of English and Portuguese, when he was confronted by 375,000 French veterans. His operations were attended by a series of successful battles; the most noted were those of Salamanca in 1812 and Vittoria in 1813. On Oct. 7, 1813, the French were driven across the Pyrenees into France, and the war was concluded the following year by a decisive victory at Toulouse.

PENN, William, founder of the colony of Pennsylvania, born in London, England, Oct. 14, 1644; died at Ruscombe, England, July 30, 1718. He was the son of Admiral William Penn, studied at Christ Church, Oxford, and there joined the new sect of Quakers. He traveled a few years in Italy and France, and later became a court favorite in England. In 1666 he managed an estate in Ireland for his father, and was imprisoned at Cork for offending a meeting of Quakers. Soon after he became a minister of that sect, because of which he lost for a time the good-will of his father, and in 1668 was imprisoned in the Tower for publishing a pamphlet entitled "Sandy Foundations Shaken," which opposed the doctrine of the trinity and other teachings of the established church. While in prison he wrote several works that attained to much popularity, among them "No Cross, No Crown,"

WILLIAM PENN.

and "Innocency with Her Open Face." After seven months he was liberated through the influence of the duke of York. The meetings of Dissenters were prohibited in 1670, but he continued active in spreading their doctrines and was again imprisoned. After refusing to take the oath of allegiance, which he did from conscientious scruples about swearing, he was confined for six months at Newgate. Soon after regaining liberty he visited Germany and Holland for the advancement of Quakerism, and on returning to England, in 1672, married Gulielma, the daughter of Sir William Springett.

His father having died in 1670, Penn came into possession of an estate valued at $7,500 per year and acquired a claim against the government for $80,000. He continued his diligence in propagating the doctrines of his sect by preaching and writing, and in 1681 accepted from the government a grant of the region now included in the state of Pennsylvania in lieu of his monetary claim. It was especially provided that he should be at liberty to promulgate his religious and political views, and to found just such colonies as he desired. The region was named Pennsylvania in honor of his father at the suggestion of King Charles II. In August, 1682, he and several friends sailed for the region of the Delaware, and on November 30 they met with representatives of several Indian tribes for an interview on the present site of Philadelphia. The consultation ended in purchasing the lands from the Indians, who always held Penn in great reverence. He founded the colony on a democratic basis, extending to all a large degree of religious liberty, planned the city of Philadelphia, and administered the affairs of the colony with much wisdom and liberality. Under the policy of Penn all sects were allowed to settle in Pennsylvania, and their religious and civil rights were respected, a course which led many people persecuted for expressing their views to seek refuge in his colony.

He returned to England in 1684. When the duke of York succeeded to the throne as James II., Penn became highly influential at the court, and through his efforts a large number of Friends were liberated from prison. After the prince of Orange succeeded to the throne, Penn continued on intimate terms of friendship with the abdicated monarch, and was accordingly charged with treason in 1689. This charge was removed, and he was honorably acquitted in 1693. In 1699 he made a visit to his colony in Pennsylvania, when he improved materially its industrial conditions, brought about a more satisfactory state of affairs in the government of the same, and bettered the relations between the colonists and the Indians and Negroes. He returned to England in 1701 to personally look after the interests of his estate, which had been left to the management of a man named Ford, who had wasted many of the resources and left extortionate claims against Penn. Refusing to pay some of these claims, Penn was thrown into the Fleet prison in 1708, from which his friends soon after released him. His death resulted from paralysis. The most important writings of his include four treatises, entitled "Great Cause of Liberty of Conscience." He was buried near the village of Chalfont St. Giles, in Buckinghamshire, in the Jordan cemetery.

PENNELL (pĕn'ĕl), **Joseph**, etcher and illustrator, born in Philadelphia, Penn., in 1860. He developed skill in drawing at an early age, married Elizabeth Robins, and much of his work was done with her assistance. The two traveled extensively in Europe, where he was arrested in 1891 by officials in Russian Poland on suspicion of securing pictures of forts. The two published a series of illustrated works, including "Two Pilgrims' Progress;" "Stream of Pleasure;" "Play in Provence," and "To Gypsyland." He wrote "Pen-Drawings and Pen-Draughtsmen," and illustrated Sterne's "Sentimental Journey" and Justin McCarthy's "Journey to the Hebrides."

PENNSYLVANIA, one of the original thirteen states of the United States, bounded on the north by Lake Erie and New York, east by New York and New Jersey, south by Delaware, Maryland and West Virginia, and west by West Virginia and Ohio. It is about 300 miles long from east to west, 160 miles wide, and has an area of 45,215 square miles, being about the size of Kentucky and Connecticut. The surface is generally hilly and mountainous through the center, where the Appalachian Mountains trend across the state from northeast to southwest, the principal chains being the Alleghany and Blue Ridge. Though the mountain system is somewhat widened in the state, the peaks are generally below 2,500 feet above sea-level. In the southeastern part is an open country, and there are highlands in the northwestern part along Lake Erie. The state has a coast line of forty-five miles on Lake Erie, on which is a good harbor at Erie. Pennsylvania is well drained by a number of river systems, the principal rivers including the Susquehanna, Juniata, Ohio, Monongahela, Alleghany, and Delaware, the last named forming its eastern boundary. The soil of the valleys and undulating regions is generally fertile, while the more hilly portions are formed principally of clays and rock. It has an abundance of rainfall, ranging from thirty-five to forty-five inches per year, and the climate is diversified according to location. The mean annual temperature is given at about 55°. In the mountains the snowfall is heavy. Formerly much of the surface was covered with a heavy growth of timber, and fully one-fourth still contains excellent forests. The different species include walnut, hem-

lock, maple, pine, laurel, beech, oak, cherry, cottonwood, chestnut, and other varieties.

Pennsylvania is especially rich in various kinds of mineral wealth, including bituminous and anthracite coal, iron, granite, sandstone, slate, marble, limestone, salt, sulphur, zinc, tin, copper, fire-clay, petroleum, and some gold and silver. The production of coal is by far the most important industry, and its supply is practically inexhaustible. The annual production averages about 68,500,000 tons of anthracite coal, and 60,125,000 tons of bituminous coal. Next to the yield of coal is the output of limestone, slate, and iron. The yield of natural gas and petroleum is an important item, and one that has produced remarkable results in the development of vast manufactories. Pennsylvania takes second rank in the aggregate value of manufactured articles, the principal products in this line including spirituous liquors, tobacco and cigars, cotton and woolen goods, ribbons, pig-iron, bessemer steel, tin plate, coke, silk textiles, machinery, engines, and utensils. At present the value of manufactures aggregates annually about $1,750,500,000. The culture of silkworms is constantly enlarging, and there is a perceptible growth in the output of its silk mills. Among the principal farm crops are hay, barley, oats, corn, wheat, rye, buckwheat, and potatoes. Many varieties of fruit yield abundantly, including grapes, apples, cherries, peaches, pears, and small fruits. Horses, cattle, mules, and sheep are included among the live-stock. The annual wool clip aggregates about 5,150,000 pounds. There is a growing production of milk and cheese, much of which is marketed within the state. The fisheries of the lake and rivers yield many varieties of important fish. Commercial enterprises are facilitated by a number of canals and the navigation of its principal rivers. The canals include about 800 miles, and the railroads 10,500 miles.

Educationally the state is well provided for, having an excellent system of common schools and higher institutions, the foundation of which was laid by William Penn. There are hospitals for insane at Harrisburg, Danville, Norristown, Philadelphia, Wernersville, Dixmont, and Warren; asylums for the blind at Philadelphia and Pittsburg; institutions for the deaf and dumb at Philadelphia, Bala, Scranton, and in Allegheny county; state penitentiaries at Allegheny and Philadelphia; reformatory schools at Huntingdon and Morganza, and an institution for feeble-minded children at Elwyn. The public school system is maintained by general taxation, and the total expenditure aggregates annually $20,525,000. Among the higher institutions maintained by the state are various colleges, normal schools, and universities. The principal institutions of higher learning embrace the University of Pennsylvania, Philadelphia; Pennsylvania College, Gettysburg; Duquesne College, Pittsburg; Washington and Jefferson College, Washington; Moravian College, Bethlehem; Muhlenberg College, Allentown; Thiel College, Greenville; Monongahela College, Jefferson; Holy Ghost College, Pittsburg; Alleghany College, Meadville; Westminster College, New Wilmington; Lafayette College, Easton; Central Pennsylvania College, New Berlin; Franklin and Marshall College, Lancaster; Irving College for Young Women, Mechanicsburg; Ogontz School, Ogontz; Dickinson College, Carlisle, and St. Vincent College, Beatty. All the leading Christian denominations maintain church organizations in the state, the numerical strength of the different sects ranking in the following order: Methodist, Presbyterian, Lutheran, Baptist, Roman Catholic, Evangelical Association, Reformed Lutheran, United Brethren, Episcopal, Church of God, and Dunkards. There are many scientific and educational societies, important libraries, and excellent periodicals, the last named numbering 1,475, of which 210 are dailies and 930 weeklies.

The history of Pennsylvania dates from 1609, when Henry Hudson visited Delaware Bay and the Delaware River. Swedish colonists established the first permanent settlements at Chester in 1643, but the Dutch took possession of that region in 1655. William Penn obtained a grant of the region now included in the state from Charles II. in 1681 in consideration of $80,000. The colony planted by Penn was designed as a refuge for Quakers, but he extended religious liberties to all, and established relations of friendship with the Indians by treaty, both parties observing the conditions faithfully for fully fifty years. A dispute between Pennsylvania and Connecticut as to the territory north of latitude 41° arose, which was settled in 1783 in favor of the former. Another dispute as to the boundary occurred with Maryland, which was settled by establishing the Mason and Dixon line in 1763-67. Philadelphia was the seat of the first continental congress, in 1774, and there the Declaration of Independence was issued on July 4, 1776. The battle of Germantown on Oct. 4, 1777, and the incidents of Valley Forge identify the state with the Revolution. It included many tories among its inhabitants, but gave loyal support to the colonies, and the state was equally enthusiastic in supporting the Union in the War of 1812, the Civil War, and the Spanish-American War. A state constitution was adopted in 1776, and the national constitution was ratified on Sept. 12, 1787. Pennsylvania is popularly called the Keystone State. Harrisburg is the capital. Other important cities include Philadelphia, Pittsburg, Allegheny, Scranton, Reading, Erie, Wilkesbarre, Lancaster, Altoona, Williamsport, Allentown, Johnstown, York, McKeesport, Chester, Norristown, Shenandoah, Lebanon, Easton, Shamokin, Potts-

ville, Pottstown, Hazleton, New Castle, Mahanoy City. The state has twenty-three cities that have a population of over 10,000 but less than 20,000, and eighteen with more than 25,000. It ranks second in population, being exceeded only by New York. The census of 1900 places the population at 6,302,115. This includes a colored population of 160,451, or 2.5 per cent., of which 40 are Japanese, 1,639 Indians, 1,927 Chinese, and 156,845 Negroes. The male population is slightly in excess, being 50.8 per cent.

PENNSYLVANIA, University of, an institution of learning situated in Philadelphia. It was founded under the direction of Benjamin Franklin in 1749, and was first known as the College and Academy of Philadelphia, but in 1779 its present name was adopted. There are excellent buildings and property representing a total value of $3,775,000, and a productive fund of $2,500,000. It is nicely situated on a tract of fifty acres overlooking the Schuylkill River. The university carries excellent courses of study, and has a library of 155,000 volumes. It is attended by 2,800 students.

PENNSYLVANIA COLLEGE, an important educational institution at Gettysburg, Penn., founded by the Lutherans in 1832. It is located on a tract of thirty-five acres. There are excellent buildings, fine courses of study, and a library of 30,000 volumes. It has an annual income of $25,000.

PENNSYLVANIA DUTCH, a name commonly applied to a German dialect spoken extensively in Pennsylvania, and by the descendants from Germans who settled there in an early period. The people speaking this dialect immigrated chiefly from Germany, Switzerland, and Austria. They settled in large colonies, thus maintaining the original language, but mixing with it a number of words derived from the English and other languages.

PENNY, a coin current in England, representing in value the twelfth part of a shilling. The name was derived from the Anglo-Saxon word penig, which corresponds to the German word pfennig. The English penny dates from the latter part of the seventh century, when it was coined under King Ina of the West Saxons, and was a silver coin weighing 21½ grains. It was made of copper previous to 1860, but is now made of bronze, containing one part of zinc, four of tin, and ninety-five of copper. Its weight is 145.833 grains troy, and its value in metal is about one-fourth of its nominal value.

PENOBSCOT (pe-nob'scot), a river and bay in Maine. The river is the largest in the state. It rises by the West Branch in a small lake near the Canada line, flows southeast into Penobscot county, where it joins the East Branch, or Seboois River, and thence flows toward the south into Penobscot Bay. The river furnishes an abundance of water power. It flows through a productive lumbering region, has a length of 300 miles, and is navigable for ships to Bangor. Penobscot Bay is an inlet from the Atlantic Ocean. It is about thirty miles long and twenty miles wide at its entrance, and contains a number of islands. Both the bay and river furnish excellent facilities for navigation, and contain valuable fisheries. Among the chief towns on the Penobscot are Bangor, Belfast, Hampden, Old Town, Lincoln, and Medway.

PENSACOLA (pĕn-sa-kō'la), a city in Florida, county seat of Escambia county, situated on Pensacola Bay, an inlet of the Gulf of Mexico. It is a port of entry, has an excellent harbor, and near it are Forts Pickens and McRae. The city has good railway and steamboat connections with many trade emporiums, and an extensive trade in lumber, cotton and woolen goods, coal, hides, tallow, fish, and supplies for the naval stores. Its public structures include the United States government building, armory, courthouse, opera house, and a number of churches and schools. It has manufactures of cigars, clothing, earthenware, canned fish, and machinery. There are electric lights and street railways, pavements, sewerage, a number of parks, and a library. The city was founded by the Spaniards in the early part of the 18th century. General Jackson captured it in 1814, and five years later it became a permanent possession of the United States by virtue of the Florida Purchase. Population, 1900, 17,747.

PENSION, an allowance by the government to a person retired from service, or to the widow and children of a deceased person. Pensions are paid as periodical allowances or rewards for service rendered in a civil or military capacity. In a number of European countries they are granted to persons who have served the government in the time of peace for a specified length of time, whether in a military or civil capacity. In such cases the pension is not based on injury or disability, but wholly upon valued services covering a long period of time. However, there is the additional provision for the payment of pensions in case of injury or disability. Such laws are now maintained in England, Germany, and other countries to a modified extent. In the United States pensions are paid wholly upon injury or disability, but congress has in many cases made special provision for persons who were left in indigent circumstances after having served their country devotedly for a long time. There is also a provision of law under which a private or non-commissioned officer who has served thirty years may, on application to the president, be placed on the retired list and receive three-fourths pay for the remainder of life. The same privilege extends to commissioned officers who have been in the service forty years and have reached the age of sixty-five years. In 1818 an act was passed granting all survivors of

the Revolutionary War service pensions; in 1871 a like law was passed in relation to the survivors of the War of 1812, and in 1878 to the survivors of the Mexican War.

An act of congress passed Aug. 26, 1776, established the pension system for disabled soldiers and sailors, and since then there have been many revisions, though the system in general is based on personal injury or disability. Invalid pensions range from $24 to $2,000 a year, this depending upon the degree of disability and the rank of the pensioner. In cases where both hands or both eyes are lost the pension is $72 per month; total deafness, or the loss of a foot or hand, $30; amputation of a limb at the hip or shoulder joint, $45; and total incapacity for manual labor, $30. Where the attendance and aid of others is required constantly, from $50 to $75 per month is paid. The widow of a deceased soldier, who would have been entitled to a pension of $12 per month, receives an invalid pension of $12 per month, and an allowance of $2 for each child of the soldier under sixteen years of age, this being paid during her widowhood. Widows and children of deceased members of the life-saving service are entitled to pensions.

In 1890 a dependent pension law was passed. By its provisions all persons who served at least ninety days in the naval or military service of the United States in the Civil War, and who were honorably discharged, are entitled to pensions of from $6 to $12 per month in case of suffering from any permanent disease or disability not caused by vicious habits, whether or not such injury or disability is the result of disease or injury contracted while in the service. The widow of a deceased soldier is entitled to receive $8 per month, provided she has no means of support other than her daily labor and was married to the deceased soldier prior to the passage of the law, June 27, 1890. It is specially provided that an attorney presenting the claim for any pension is not entitled to more than $10 in any case, and the penalty for violation is fixed at a fine of not more than $500 and imprisonment for not more than two years, or both.

By an act of 1833 the pension business was established as a special bureau, and in 1849 it became a bureau of the department of the interior. The president appoints the commissioner of pensions, who has the assistance of about 2,000 persons in the transaction and settlement of the pension business, and fully 3,000 surgeons are nominated in different sections of the country as examiners of applicants. Anyone making false statements in relation to procuring a pension is liable to fine. Pensions are paid every three months, and there are agencies in different parts of the United States to distribute to pensioners the vouchers issued for them. Pension money due individuals from the government cannot be taken by garnishment or attachment. This is a provision of the national statute, and in some of the states money received as pensions and invested in securities or property of any kind cannot be taken by a court process in payment of debts without the consent of the pensioner. It has been the policy of the United States government to extend every possible courtesy and assistance to the veterans of the wars and those who have defended the flag. The amount paid pensioners in 1862 aggregated about $790,000; in 1872, $30,000,000; in 1882, $54,000,000; and in 1892, $133,000,000. In 1900 the amount paid to pensioners was $138,462,130.65; the number of pensioners on the roll that year being 993,529. The total amount paid in pensions from July, 1865, to June 30, 1900, is $2,528,373,105.39; and the amount paid from July 1, 1790, to June 30, 1900, is $2,624,818,549.62. In 1900 the amount disbursed for pensions on account of the war with Spain was $322,905.25.

PENTATEUCH (pĕn'tȧ-tūk), a term applied to the first five books of the Old Testament when spoken of collectively, these including Genesis, Exodus, Leviticus, Numbers, and Deuteronomy. The Jews apply to them the Hebrew name Torah, meaning the Law. Josephus was the first to mention the five-fold division. Many modern writers group these five books with the Book of Joshua under the term Hexateuch, since they form a continuous line of writing.

PEONAGE (pē'ŏn-ăj), a term variously applied in different countries, but usually to describe a system of servitude in Spanish-American countries. The peon of Mexico was in early colonial times placed under bondage to serve his creditor until the debt was paid, and by reason of limited wages and a system of loaning money to the peons it often became necessary for several generations to labor before the obligations could be complied with. A law of congress, in 1867, abolished peonage in New Mexico, where it had been introduced from Mexico, and it has since been abolished in some of the countries of South America, though in others it still remains as a system not unlike perpetual servitude.

PEONY (pē'ō-nȳ), a genus of plants of the crowfoot family. They are cultivated extensively in gardens and for ornamental purposes. The species include a half shrubby plant native to eastern Asia and Japan, where it attains a height of about twelve feet, and bears beautiful whitish flowers with pink markings. Other species are of the herb order, having deeply lobed leaves and perennial tuberous roots. The Siberian peony bears a double white flower; the peony native to Switzerland has double crimson or white flowers, and the Russian peony is fern-leaved; all these belong to the herbs. Emetic and cathartic properties

are found in the seeds and roots, and formerly the common peony was held in repute for its medical properties, though at present it is not so regarded.

PEOPLE'S PARTY, a political organization formed in the state of New York in 1824 by a wing of the democratic party, which favored choosing the electors by a direct vote of the people. They supported William H. Crawford for president, who received forty-one votes in the electoral college. In 1891 the various farmers' alliances, labor and granger organizations, and the greenback party organized the people's party that was prominent in the election of 1892 and several subsequent elections. James B. Weaver, of Iowa, was the nominee for president in 1892, receiving 1,030,128 popular votes and twenty-three votes in the electoral college. In 1896 and 1900 the party supported William J. Bryan, the nominee of the democratic party, for president. Among the principal issues advocated by the people's party are included the abolition of national banks; the issuance of money direct by the government; the payment of all government obligations in any kind of lawful money; the establishment of postal savings banks; bimetallism; an income tax; the election of United States senators by direct vote of the people, and opposition to all forms of monopoly harmful to industrial and commercial enterprises.

PEORIA (pē-ō′rĭ-ą), a city of Illinois, county seat of Peoria county, on the Illinois River, 162 miles southwest of Chicago. It is connected with other trade emporiums by a large number of important railroad lines, and has excellent navigation facilities by the Illinois and Mississippi rivers with the Gulf of Mexico. The city has an extensive public school system, including courses from the kindergarten to the high school. It is the seat of a United States government buildings, the Peoria County Normal School, a fine county courthouse, a city hall, and many excellent churches. There are fine electric facilities, including lights and street railways. It is surrounded by a country rich in agricultural products and deposits of bituminous coal. It is the seat of the Cottage Hospital, a fine building of Bedford stone. The manufactories give employment to 8,500 persons and yield products annually having a value of $60,000,000. Distilling is the most important industry, producing annually about 35,000,000 gallons of spirits. Other manufactures include jewelry, soap, carriages, trunks, watches, farming machinery, hardware, monuments, furniture, oatmeal, tobacco products, brooms, and stoves. The city is beautifully located, has well paved streets, waterworks, several public parks, a number of libraries, and is the center of much commercial and educational activity. In 1680 a post was established on its site by La Salle. It was incorporated as a city in 1844. Population, 1900, 56,100.

PEPIN LE BREF (pęh-păn′), the youngest son of Charles Martel and father of Charlemagne, born in 714; died in September, 768. In 741 Charles Martel gave him as a heritage Burgundy and Neustria, while his elder brother, Carloman, received Thuringia, Swabia, and Austrasia. Their reign was largely influenced by the Merovingian sovereign, but in 751 Pepin became king of the Franks, succeeding Childeric, the last of the Merovingian kings. In 755 he invaded Italy as an ally of Pope Stephen III. for the purpose of expelling the Lombards, and soon after established the temporal sovereignty of the pope by making him ruler of Ravenna. His two sons, Charlemagne and Carloman, received the territories of Pepin under a division at his death. Pepin was not only an active and enterprising military commander and civil ruler, but he was the sovereign who united the Gallic nation. His surname, meaning The Short, was given to him because he was short in stature, but he was noted for his physical strength.

PEPPER, a class of plants native to the East Indies, but now extensively naturalized and cultivated. There are a large number of species, but the most important is the variety known as black pepper or common pepper. This is a climbing plant. It bears broad ovate leaves, and globular berries of a bright reddish color when ripe, for which it is grown in fields and plantations. Poles or other supports are provided for the plants, which bear fruit in three or four years, and the berries are picked when beginning to turn red. Their color afterward becomes black, and the berries shrivel in drying, when they constitute the common or black pepper sold in the market. Two crops are secured annually, the plants yielding about ten pounds of pepper berries annually for from eight to twelve years, and the fruit constitutes one of the most valuable and extensively used of the spices. Black and white pepper are made from the same berries. The white pepper is soaked in water before grinding and the outer covering is rubbed off. Formerly pepper was of an extraordinarily high price, but since the early part of the last century its cultivation has been greatly extended and the price correspondingly cheapened. Sumatra, Java, and Malacca are the most productive regions at present, but pepper culture has been introduced in the West Indies and other tropical regions.

PEPPER.

PEPPER, William, educator and author, born in Philadelphia, Penn., Aug. 21, 1843. In 1862 he graduated from the art department of the University of Pennsylvania; two

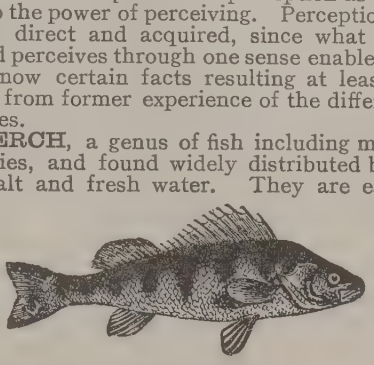
years later from the medical department of the same institution, and soon after became a professor of medicine there. He was elected provost of the university in 1881, but resigned in 1894. Pepper lectured and wrote extensively on various historical, philosophical, and scientific subjects. In 1891 he was president of the American Association of Physicians, and in 1893 of the Pan-American Medical Congress at Washington. He published "Sanitary Relations of Hospitals" and "System of Medicine by American Authors," and founded "The Medical Times."

PEPSIN, a digestive compound contained in the gastric juice of the stomach, which possesses the power, when united with hydrochloric acid, to dissolve the otherwise insoluble proteids and convert them into peptones. Pepsin is a ferment. It is soluble in water, weak spirits, and glycerine, and its function is to render soluble and diffusible substances that would otherwise be indigestible to a considerable extent. When the food has been dissolved under its influence, it forms a grayish liquid called chyme. Both pepsin and hydrochloric acid are secreted by the stomach, and the vigorous action of that organ depends upon the proper production and union of the two. The exact nature of pepsin is not known, but it constitutes an essential element in the digestive process, and forms ordinarily about eighty per cent. of the composition of the gastric juice. Pepsin is obtained from the stomach of the calf, pig, and other animals, and is used largely in the medical practice as a stimulant in cases of disorganized digestion. The pepsin of the market is a light-yellowish powder, which enters as a constituent into most of the digestive preparations. Alcohol impairs the activity of pepsin, but this is compensated for, at least partly, by its stimulating influence.

PEQUOTS (pē'kwŏts), or **Pequods**, a North American Indian tribe belonging to the Mohican family, and first met with in Connecticut. In 1634 they entered into a treaty with the colonists at Boston, but soon after became hostile, and in 1637 were defeated near the present site of Groton, Conn. The struggle against them continued for a number of years, resulting in great loss of life, but they were finally subdued in a battle at Fairfield Swamp. Shortly after they became widely scattered or were sold as slaves. At present the tribe is assimilated in part by other tribes, and a few of the descendants are found in Wisconsin, mostly at Green Bay.

PERCEPTION (pĕr-sĕp'shŭn), the faculty of the mind by which we gain knowledge, through the senses, of the existence and properties of matter. It is the power that the mind has of cognizing external objects and their qualities. Perception differs from conception in that it deals with things having an actual, not merely a possible, existence; and from consciousness, in that it is concerned with objects external to the mind. Writers have employed the term in various relations, and it is now sometimes applied to the act and product of perception as well as to the power of perceiving. Perception is both direct and acquired, since what the mind perceives through one sense enables us to know certain facts resulting at least in part from former experience of the different senses.

PERCH, a genus of fish including many species, and found widely distributed both in salt and fresh water. They are espe-



YELLOW PERCH.

cially abundant in the northern part of the United States and Canada, and are found in the ponds, rivers, and lakes of northern Eurasia and off the coast of these and other regions. The common fresh-water perch has a broad body flattened laterally, and two dorsal fins supported by strong bony spines. The color at the upper parts is greenish-brown; blackish bands mark the sides, and at the lower parts the color is a goldish-yellow. From one to three pounds is the usual weight. The perch feeds on smaller fishes, worms, and insects, and is fond of still waters. The yellow perch common to the fresh-water bodies of the United States is a favorite food fish, and may be easily propagated in artificial lakes and ponds. It seldom nibbles at the bait, but bites quickly at hooks baited with worms or minnows.

PERCIVAL (pĕr'sĭ-vạl), **James Gates**, poet and geologist, born in Kensington, Conn., Sept. 15, 1795; died in Hazel Green, Wisconsin, May 2, 1856. He graduated from Yale University in 1815. After teaching school and studying medicine, he began a successful practice in Charleston, South Carolina. In 1824 he became professor of chemistry and surgery in the United States Military Academy, but soon after received an appointment as surgeon in the recruiting service at Boston. In the meantime he contributed a number of articles to the "United States Literary Magazine," published several volumes of poetry, and studied geology. He was made geologist and mineralogist of Connecticut in 1835, and in 1854 became geologist of the state of Wisconsin, where he afterward surveyed in the lead region for several mining companies. His principal works include "Prometheus;" "Clio;" "Dream of a Day," and "Collection of Poems." He is the author of several valuable geological reports.

PERCY, the name of a celebrated Norman family, which descended from William

de Percy, who came to England with William the Conqueror in 1066. This sovereign granted him large tracts of lands in the north of England, where his family held vast possessions for many ages afterward. The house of Percy is the most distinguished of all the noble houses of England, and it is alike remarkable for its culture of arts and letters and for its long, unbroken line. In 1766 the present dukedom of Northumberland was created in the Smithson family, who assumed and still bear the name of Percy.

PERFECTIONISM (pẽr-fĕk'shŭn-ĭz'm), the doctrine held by various religious sects that perfection is attainable in this life, and when that state is reached the believer is freed from responsibility for sin. Those holding this view generally agree that the soul becomes united with God by contemplation and devotion until all that is sinful in it is annihilated, and it participates in the divine protection. However, they do not assume superiority of goodness over others, since their condition is due to the work of grace, and they are free from sin and guilt in that they do not consent to be led astray by temptations. Most of the advocates of this doctrine hold that it is a state of growth in which the soul may maintain perfection and progress in developing into consecutively higher states, thus making the early stage only a beginning of growth in grace. In the Roman Catholic Church it is held that no one can live absolutely without sin, except by divine grace. That perfection is a state equivalent to sanctification, and not for the complete achievement thereof, was first held by the German Mystics, and next passed to the English Methodists. This is in effect the view held at present by the Friends, certain Methodists, and several other sects, and it is generally termed entire sanctification, meaning complete consecration of soul to God. Protestant churches generally deny the attainment of perfection in this life, and hold that the progressive process of sanctification cannot be completed in this world, thus teaching the need of daily prayer for the forgiveness of sin by every Christian.

PERFECTIONISTS, Bible Communists, or **Free Lovers,** an American religious sect founded in 1848 by John Humphrey Noyes. The organizer was born at Brattleboro, Vermont, Sept. 6, 1811. He was first a clerk in a law office and later was admitted to the bar. Subsequently he practiced his profession for some time at Putney, Vermont. In 1831 a religious revival spread in the New England states, and he became a Congregational minister. Soon after he separated from that church, claiming to have experienced a second conversion, and began organizing a sect with the view of restoring ideal primitive Christianity. The first church organized as a community was at Putney, but soon after it was removed to Oneida, New York, and another was established in the vicinity of Wallingford, Conn. Among the teachings are community of labor and its fruits; that communication with Christ provides a relief from disease, sin, and death; that all must be reconciled with God to secure salvation; that man and woman must be recognized on the equality of brotherhood, and that faith in God is the necessary element in securing salvation. Perfectionists were originally organized in a family, in which fixed marriage ties were not recognized, but in 1880 the ordinary family relationship by marriage was established. Noyes died at Niagara Falls on April 13, 1886, and since then many property and other reforms have been effected by the members.

PERFUMES (pẽr'fūmz), the fragrant substances prepared to emit pleasant odor, and used to fill the air with an agreeable scent. The manufacture of perfumery dates from remote antiquity. It was a common art among the peoples of Assyria, Babylonia, Egypt, Phœnicia, and Palestine. The Grecians and Romans developed the manufacture of perfumes into an important industry, while during the Middle Ages it spread to western Europe. Two classes of perfumes are recognized in arts and trades, those derived from an animal and those from a vegetable origin, and they are known in the market as crude and prepared. Crude perfumes are those secured from animals or plants, which are not mixed as special preparations; while prepared perfumes are those sold under special names, being mixed according to particular formulæ. At present there are many different classes of prepared perfumes on the market, some business houses manufacturing several hundred different kinds.

Perfumes of animal origin include musk, ambergris, hartshorn, civet, and castor. Musk is the most important of these, since it has the most permanent scent. It is used largely in the preparation of many perfumes, and serves in that capacity to add durability and intensity to the fragrance of many of the sweet-smelling preparations. The vegetable perfumes include a large variety. They are made from flowers, such as the violet, rose, and tuberose; from different kinds of wood, such as sandal-wood, sassafras, and cedar; from various fruits, among them the lemon, orange, and bergamot; from seeds, such as dill, caraway, and aniseed; from spices, including the cloves, nutmeg, and cinnamon; from herbs, among them peppermint, lavender, and rosemary; from nuts, such as vanilla and bitter almonds; from roots, such as orris root, and from gums, including the styrax, camphor, and myrrh. Some of the vegetable perfumes are obtained from plants and trees, from which they exude naturally, or are obtained from wounds inflicted artificially in the bark or wood. These include the gum-resins, among them such as benzoin, myrrh, and camphor.

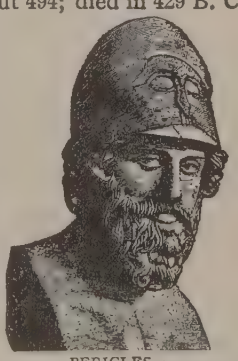
Most of the vegetable perfumes are procured in the form of essential oils by distillation. These perfumes were formerly called quintessences, but now they are generally termed ottos, from the Turkish term attar, a word associated with the rose. Distillation involves the simple process of placing the fragrant product of the plant in a still of tinned copper, where a quantity of water is added. A small furnace underneath supplies the heat, and, when the water boils, the odorous parts are carried into the worm with the steam, and afterward decanting is employed to separate them from the latter. Roses are gathered for distilling about the first of June, and are placed in cool cellars until they can be distilled. All the roses of the harvest are distilled by a single process, when the product forms only rosewater, which is distilled a second time. The product now includes the sweet-smelling, oily attar in the form of little globules, but still contains a quantity of water. By placing it in small vessels, the oily attar comes to the top and is separated from the water by dipping it with a spoon. The otto of roses is the most expensive perfume on the market, and the higher grades made of selected rose petals sell at $500 per pound. There are two other processes for extracting perfumes, known as enfleurage and maceration.

The process known as enfleurage consists of placing a layer of grease, such as suet or lard, in a small box, and placing the fresh blossoms of flowers on the grease. The box is carefully closed and allowed to stand about twenty-four hours, and fresh flowers are added every twenty-four hours for several weeks, when the fat becomes filled with the perfume of the flowers, and after melting and straining it is ready for use. The process of maceration consists of placing flowers in oil or melted fat for a few hours, when the fat is heated and the flowers strained out. New flowers are added from time to time until the grease is highly perfumed, when the product is bottled for use, or the oil may be melted and combined with alcohol, by which volatile oil is brought to the surface. It is then skimmed off the surface and bottled. Such flowers as the tuberose and jasmine are injured by heating and their perfumes are extracted by enfleurage, while in some cases both processes are employed. The manufacture of perfumes is an extensive industry in France, Germany, England, and various cities near the Mediterranean. Lavender is produced in large quantities in England, while Nice leads in the production of violet and mignonette, and Cannes in manufacturing perfumes from the jasmine, rose, and tuberose. The principal manufactures in America are in the middle and New England states, but there are also growing interests in the preparation of perfumes on the Pacific coast.

PERGAMUS (pĕr′gă-mŭs), or **Pergamun**, an ancient city of Asia Minor, located in Mysia, fifteen miles from the mouth of the Caicus River. It is thought that the city was founded by Arcadian colonists under Telephes, son of Hercules. In the time of Alexander the Great it was made the treasury of the Grecians, and in 280 B. C. Philetærus established it as the capital of an independent kingdom. The Romans acquired complete control of the kingdom, and established it as the province of Asia, and under them the city became a great center of commercial activity and military influence. It was one of the principal seats of worship, and invalids flocked there to obtain advice from its deities and priests. At that time it had a public library second only to the library of Alexandria, but the city began to decline when it came under the influence of the Byzantine emperors. It is now known as Bergama, and is noted for its ruins of ancient palaces, temples, aqueducts, and walls.

PERI (pē′rĭ), a being mentioned in Eastern legends as immortal, but who is excluded from Paradise. He is said to have descended from fallen spirits, and was thought to occupy a position midway between angels and demons. There are many interesting fables that mention peris in various relations, and belief in them is enjoined upon Mohammedans by the Koran. Generally both grace and beauty are attributed to spirits of this class when represented as female, though generally they are regarded as both male and female. When spoken of as male beings, they personify strength and skill in administering to the wants of mankind.

PERICLES (pĕr′ĭ-klēz), celebrated statesman of ancient Greece, son of Xanthippus, born at Athens about 494; died in 429 B. C. His father won the celebrated battle at Mycale over the Persians in 479, thus giving the family a high repute among the Hellenic people. Pericles secured a liberal education under the master teachers of his time, among them the philosopher Anaxagoras. He not only possessed extraordinary ability as a student, but became distinguished for patriotic devotion to country, eloquence, and dignity of manners. His rise into prominence was rapid, notwithstanding his advocacy of the reasonable view that laws must be enacted and enforced for the general interest of the people instead of special classes. Though he lived plainly as a private citizen, it was possible by his force of eloquence and genius to shake the policy of



PERICLES.

the state. It was his desire that Athens should remain the most powerful political influence in Greece, and that the people themselves should wield the power in Athens. He placed full confidence in a government by the masses, and depended upon securing the popular support of the people in the interest of just measures by disseminating knowledge in education and educational arts. Accordingly he utilized every means available to bring the common people in touch with the best education attainable, and provided a revenue whereby they could afford to sit as jurors and attend the assembly to listen to public discussion. Magnificent public buildings were erected under his direction, both for the entertainment and education of the populace. They were adorned with the noblest historical paintings, and the dialogues of Euripides, Æschylus, and Sophocles were performed free before the multitude. He encouraged philosophers, artists, poets, and orators in such a manner that his time is spoken of as the Age of Pericles, because in it Hellenic civilization reached its finest blossom and fruitage.

Pericles represented the democracy, while Cimon was the leader of the nobles and commander of the army. In 461 B. C. the latter was exiled under pressure from the common people, and Pericles accordingly became the central figure of the Athenians, but Cimon was recalled four years later with the understanding that he should command the army in foreign countries, while the affairs in Greece should be left to Pericles. The enterprise of the Athenians may be realized in their extensive improvements at home and the vast military operations abroad, conducting in a single year, in 457 B. C., wars against Egypt, Cyprus, Phœnicia, Ægina, and on the coast of Peloponnesus. With the death of Cimon in 449 B. C., Pericles became almost the sole authority in affairs of state, but this he continuously exercised in the interest of democracy. Thucydides, son of Milesias, succeeded Cimon as the head of the aristocratic party, but he was exiled in 444. Pericles established such general confidence in his ability that he remained the central influence in Athens to the end of his life, and his rule became one of unexampled prosperity. At that time lived in Athens the celebrated poets, Euripides, Æschylus, and Sophocles; the philosophers, Socrates, Anaxagoras, Zeno, and Portagoras; the astronomer, Meton, and the painters, Myron and Phidias.

In the latter part of his life Pericles turned his attention to the policy of uniting the Grecian states into one political union, but the jealousy of Sparta brought on the Peloponnesian War in 431. In the long contest that followed Athens was supported by the Ionians and the democracy, while Sparta was aided by the Dorians and the aristocracy. A very disastrous plague spread over Athens in the second year of the war. Among the thousands of people who died were the two sons of Pericles, Paralus and Xanthus. Pericles succumbed to the disease about a year afterward. His sudden death was the greatest loss of all, since no statesman of recognized ability was left to guide the people. Pericles was generous in the management of public affairs, and, being richly endowed by nature with the higher qualities of manhood, he responded to all that was beautiful and noble in literature and art. There were many who denounced his policy of expending money for public improvements, the grandest and most beautiful of Greece. Among the many excellent structures erected in accord with the policy of improvement advocated by him were the Odeum, the Parthenon, and the Propylæum. Under his direction Athens became the center of art, science, and inventive skill, and its commerce and material industries became developed on a highly flourishing scale. Pericles is not only the type of the ideal spirit of his own age, but of antiquity. He is represented of graceful form, but with an unusual height of forehead, while his lips were full and the nose of straight Grecian form. He was buried among the great dead at Ceramicus. Thucydides spoke of him as "powerful from dignity of character as well as from wisdom."

PERIM (pā-rēm'), a barren and destitute island in the Strait of Bab-el-Mandeb, near the entrance to the Red Sea, about two miles from the Arabian shore and nine miles from Africa. The island is four miles long, two miles wide, and has an area of seven square miles. Its general elevation is 245 feet above the sea. It is important as a strategic position in the Red Sea. Since 1857 it has been a possession of the British, who maintain a lighthouse and coaling station. It is governed as a dependency of Aden. Anciently it was called Diodori Insula.

PERIODICAL (pē-rĭ-ŏd'ĭk-*al*), a publication issued at regular intervals, such as a magazine. Periodicals are devoted either to the circulation of news or the promotion of knowledge in literature, arts, science, or the industries. The term is variously applied to different publications appearing at regular intervals, though not generally to daily newspapers. A periodical devoted principally to general criticism is called a review, and one having contents of a miscellaneous or entertaining character is known as a magazine. In the United States and many other countries the different periodicals are not closely specialized, but in Germany they are confined quite carefully to particular lines, and are published with the view of meeting quite consistently the taste of particular classes of readers. Most of the publications of America are of a miscellaneous character and are designed to meet the wants of many different classes, though

there are some quite closely confined to the individual needs of different professions, trades, and occupations. See **Journalism**.

PERNAMBUCO (pĕr-năm-bōō'kō), or **Recife**, an important city in northeastern Brazil, capital of a province of the same name, located on the Atlantic coast. It is situated near the mouth of the Biberibe River, and consists of three parts—Boa Vista, on the mainland; Recife, on a small peninsula; and San Antonio, on an island. Recife is the principal seat of commerce, but is connected with the other parts by a number of excellent bridges. The city has broad and well improved streets, an excellent harbor, and a lighthouse. It is defended by strong forts. Among its improvements are several public parks, waterworks, pavements, public lighting, and street railways. The principal buildings include an Episcopal palace, numerous educational institutions, many churches, a theater, and several extensive warehouses. Pernambuco is the most extensive sugar market of Brazil. It has a large export and import trade in various manufactures, farm produce, and livestock. Its manufactures include tobacco, cigars, clothing, leather, dyes, implements, sugar, machinery, and earthenware. There are telegraphic connections with Europe and extensive railroad facilities with interior cities. Population, 190,250.

PERPETUAL MOTION (pẽr-pĕt'ū-*al*), a motion which, being once generated by mechanical means, continues perpetuating itself indefinitely. The problem of inventing machines to move perpetually was studied in different countries as early as the 13th century. When the conservation of energy was discovered, it became apparent that the hopes of ambitious inventors to construct a machine which, once set in motion, would perpetuate its movement without drawing on any external source of energy, were vain and delusive. The Academy of Science in Paris as early as 1775 refused to further entertain schemes that claimed to have overcome the impossibility, and henceforth considered the problem equally absurd with the duplication of the cube and the quadrature of the circle. No combination can produce energy; it can only direct the energy imparted. If a body could be set in motion where it would not be exposed to friction or fluid resistance, it would continue to move forever. However, friction occurs as soon as a moving body comes in contact with the air or with other bodies, and by it the motion must be eventually overcome. Even if conditions existed whereby a body could be induced to move perpetually, such a machine would be useless, for the reason that the quantity of energy possessed by it would be limited to the energy applied to start the device, and if it were employed to do any work or impart motion to other machines, it would cease moving as soon as it had expended an amount of energy equal to that imparted to it in the beginning. Many patents have been issued to persons claiming to have invented devices by which perpetual motion was secured, but in every case it was shown successfully that the mechanical structure was useless and the originator ignorant of established principles of philosophy. Among the favorite contrivances are the overbalancing-wheel; a device in which a system of weights slide to produce continuous movement; wheels having iron attached which are to be attracted by magnets, and masses of liquid moving within a mechanical device.

PERRAULT (pă-rō'), **Charles**, eminent author, born in Paris, France, Jan. 12, 1628; died May 16, 1703. He was the son of an advocate, received under his direction a liberal education, and in 1651 was admitted to the bar at Paris. He practiced law for several years, and afterward became controller-general of the royal buildings. After producing a number of excellent literary treatises, he was admitted to the French Academy. Soon after he became involved in controversies regarding literary criticisms, in which many of the learned men of France became interested. Perrault is not famous so much for the invention of the subjects of his writings, which consist largely of fairy tales, but in adapting them to a literary style of much beauty and childlike fancy. The principal writings of this character embrace "Bluebeard;" "Little Red Riding Hood;" "Sleeping Beauty;" "Puss in Boots;" "Hop o' My Thumb;" "Cinderella," and "Riquet of the Tuft." He is the author of 200 critical biographies. His "Memoirs" were published at Avignon in 1759.

PERRY, a city in Oklahoma, county seat of Noble county, about ninety miles south of Wichita, Kansas. The surrounding country is fertile, producing cereals, fruits, and grasses. It has railroad facilities, electric lights, waterworks, and a growing trade in merchandise. The rapid growth of Perry is due to the enterprise of its citizens and to its convenient transportation facilities. Population, 1900, 3,351.

PERRY, Arthur Latham, educator and author, born in Lyme, New Hampshire, Feb. 27, 1830. In 1852 he graduated from Williams College, Massachusetts, and two years later became professor of political economy and history in that institution. He contributed to various journals in the interest of free trade, and debated that question with Horace Greeley before audiences in Boston, New York, and other cities. His writings include "Foes to the Farmers;" "Elements of Political Economy;" "Williamstown and Williams College," and "Introduction to Political Economy."

PERRY, Oliver Hazard, naval officer, born in Newport, Rhode Island, Aug. 23, 1785; died at Port of Spain, on the island of Trinidad, Aug. 23, 1819. He entered the

United States navy as midshipman in 1799, became lieutenant in 1807, and in 1812 was transferred from a command on the Atlantic coast to do duty on Lake Erie under Commodore Isaac Chauncey. On Presque Isle (now Erie) he was chosen to superintend the building of a number of small vessels. His squadron fitted up in this manner consisted of nine vessels, with which he attacked the British fleet under Captain Robert Barclay, who had a flotilla of six vessels of larger size. The squadron under Perry sailed from Put-in-Bay on Sept. 10, 1813, and on the same day he gained a splendid victory over the British, capturing the entire flotilla. His announcement of the event to the government was his famous dispatch: "We have met the enemy and they are ours." Perry was accorded a vote of thanks by congress, and the rank of captain was conferred upon him. This victory was important because it caused the British to lose control of Lake Erie, and they were compelled to evacuate Detroit. Subsequent to the war he served in the Mediterranean, and in 1811 commanded a squadron in the Caribbean Sea. His death occurred from yellow fever, after returning from a trip up the Orinoco River. A fine statue of Perry was erected at Cleveland, Ohio, in 1860. Citizens of Newport erected a bronze statue opposite his old home. It is a fine bronze production by William G. Turner, and was unveiled on Sept. 10, 1885.

O. H. PERRY.

PERSEPOLIS (per-sĕp'ō-lĭs), a celebrated city of ancient Persia, which is famous for its former importance and the remarkable ruins on its site. It was located in a fertile valley near the confluence of the Medus (now Polwar) and the Araxes (now Bendemir) rivers, about thirty-five miles northeast of Shiraz. Persepolis is the Grecian name, its Persian name being now unknown. The city was one of the capitals of Persia. Its founding is ascribed to Cyrus, though some writers think it was not the capital until many years after the time of that eminent Persian, and that it became the residence of Darius, Xerxes, and Artaxerxes. Many of the leading monarchs of Persia were buried there. On its site are various remains of marble columns, bas-reliefs, huge figures, walls, and other notable ruins. Both history and the extent of its ruins indicate that the city at one time possessed vast wealth and great magnificence. Alexander the Great destroyed the city in 331 B. C. to demonstrate to the people of Asia his great military power. Tourists find much of beauty and interest at its site.

PERSEUS (pẽr'sōōs), in Greek legend, the son of Zeus and Dannaë, daughter of Acrisius, king of Argos. An oracle foretold that a son of Dannaë would cause the death of Acrisius, and he accordingly imprisoned her in a tower of brass, but Zeus rescued her and made her his bride. Four years later Acrisius discovered the marriage union and learned that a babe had been born, when he promptly ordered that the mother and child should be secured and thrown into the sea. Under the direction of Zeus, the chest floated safely to one of the Cyclades, the island of Seriphus, where Perseus was protected by the king of the island under promise that he would slay the Gorgon Medusa and bring her head to him. In this he was aided by Hermes and Athena, who protected him from danger, while the Nymphs lent assistance in his Herculean task. After reaching the dwelling of Medusa near Tartessus, he cut off her head with the sickle furnished by Hermes, and on his return liberated the beautiful Andromeda from a sea monster. Later he rescued his mother from Polydectes by turning the latter into stone. At the funeral games, celebrated in honor of the king's father, an arrow thrown by Perseus struck Acrisius, and thus he was the innocent cause of his grandfather's death. Shortly after he became king of Tiryns, and in the course of time founded the cities of Mycenæ and Midea. Perseus was celebrated and worshiped as a hero, not only in Greece, but in Asia Minor and Egypt. Many of the splendid figures of ancient art were dedicated to him, and after his death he was assigned to a place among the stars.

PERSIA (pẽr'shĭ-ạ), called by the natives Iran, one of the most extensive countries of western Asia. It is bounded on the north by Russian territory and the Caspian Sea, on the east by Afghanistan and Baluchistan, on the south by the Arabian Sea, and on the west by the Persian Gulf and Asiatic Turkey. It extends about 900 miles from east to west, 700 miles from north to south, and has an area of about 628,000 square miles. Its surface consists principally of an elevated plateau, much of which is desert, and along the western and northern boundaries are vast areas broken up by chains of rocky and precipitous mountains. The eastern part is quite level, but elevated, and along the Arabian Sea and Caspian Sea are tracts of fertile coast plains. The general elevation of the interior ranges from 2,000 to 6,250 feet above sea-level, while the Elburz Mountains, trending along the Caspian Sea, rise to nearly 20,000 feet, Mount Demavend being the culminating peak. West of the Caspian Sea are the mountains of Ararat, and along the Persian Gulf are several ranges approximating an elevation of 16,500 feet.

The climate of Persia varies according to location and elevation. In the central part the summers are extremely hot and the winters cold. The region lying adjacent to the Persian Gulf has remarkably hot and oppressive summers, and its winters are quite moist. As a whole the rainfall is limited, some regions being particularly arid, but along the Caspian and Arabian seas and the Persian Gulf there is an abundance of moisture and a dense growth of forests. Among the more important trees are elm, walnut, oak, beech, cypress, cedar, box-elder, and cottonwood. The rivers of the interior are few and unimportant, the only ones of note being several along the western boundary. Lake Urumiah, in the northwestern part, is the most important body of water, but there are many inland saline lakes, fully thirty of them covering a considerable area and having no visible outlets to the sea. The Euphrates forms a small portion of the western boundary, and is the only river of importance in navigation, though the Karun has been improved by jetties and canals for smaller boats. Various kinds of wild animals still inhabit the deserts, mountains, and forests, including antelopes, wolves, buffaloes, boars, foxes, lions, leopards, jackals, Caspian-cats, and many species of birds. The birds include the wild pigeon, snipe, wren, swallow, owl, sand grouse, and nightingale.

Agriculture ranks as one of the leading industries. It is carried on partly in regions naturally supplied with sufficient moisture and partly in irrigated districts. The principal products embrace wheat, barley, cotton, rice, tobacco, opium, and many varieties of fruits, particularly dates, grapes, and oranges. Sugar-cane is cultivated extensively. Stock raising is carried on largely in the regions illy adapted for cultivation. Among the domestic animals are sheep, cattle, horses, goats, camels, mules, and swine. Persia has an abundance of mineral wealth, but it still awaits development. The principal minerals are salt, coal, iron, copper, sulphur, lead, antimony, and turquoises. The last named product is obtained chiefly in Nishapur. Excellent fisheries exist on its coast, the pearl fisheries of the Arabian Sea being particularly noteworthy. Among the chief manufactures are carpets, Persian fabrics, sugar, tobacco products, utensils, dyes, and opium. The leading imports include hardware, petroleum, cotton and woolen goods, glass, tea, coffee, and chemicals; and the leading exports embrace fruits, rice, wool, opium, hides, pearls, silk, cotton, and salt. Commercial enterprises are carried on principally by pack mules and camels. A railway line extends from Teheran to several inland towns, and an extension to the Persian Gulf is projected. The telegraph lines include about 5,500 miles. Persia has a growing telephone system, 125 post-offices, and a number of periodicals.

The educational interests of Persia are in a very primitive state. Instruction is carried on by means of primary schools, tutors, and a considerable number of higher schools. Government support is extended to the higher schools and a number of colleges, mostly in the form of grants, and the courses outline instruction in religion, Persian and Arabic literature, sciences, and some of the industries. The Koran is the principal book of instruction, and the greater part of the people who receive any instruction at all learn to read that book. The government is an absolute monarchy, and the shah is an autocrat in all his official duties, except as he is commanded by the Koran. Within recent years a responsible ministry has been established under the shah. Persia is divided into thirty-three provinces, in which governors-general administer the law under the direction of the shah. The priests have a large influence in governmental affairs, and justice is generally summarily administered. There is a standing army of 25,000 men, but a reserve brings the mobile military force up to 105,500. The navy consists of five small steamships. Revenue is raised principally from the mines, fisheries, customs, and various concessions. The kran is the monetary unit, and is valued at eight cents in United States currency. The largest estate of Persia belongs to the shah, is estimated at a value of $22,500,000, and consists largely of precious stones.

The history of Persia begins several thousand years before the Christian era, but the earliest data are wrapped in doubt and tradition. Originally, the country was limited to a small tract along the north shore of the Persian Gulf. Later it became part of the Assyrian Empire, but in 708 B. C. an empire was established under Dejoces. The sovereigns eventually united the kindred tribes and subdued all of Assyria. Cyrus, about 558 B. C., rebelled against the Medes, and by his successes made the Persians a powerful nation. The boundaries were extended to include Syria, Palestine, Mesopotamia, and Asia Minor, and he became known as the founder of the Persian Empire. His son, Cambyses, succeeded to the throne in 529 B. C., and during his reign of seven years conquered Egypt, Tyre, and Cyprus. Darius I. annexed Macedonia, Thrace, and a part of India. Xerxes I. became the ruling sovereign in 485 B. C., and was succeeded by Artaxerxes I. in 465 B. C., the latter ruling until 425 B. C. Soon after internal strife began to divide the empire, and in 330 B. C. Alexander the Great, king of Greece, conquered all of the former provinces of Persia and made them a part of Greece.

With the death of Alexander, in 323 B. C., Persia was divided into several provinces, but the greater part was governed by Seleucus, the general of Alexander, and later by his successors, the Seleucidæ. Subsequently a long line of dynasties governed

the country, during which time it was visited by successive wars that destroyed its former glory and tended to greatly lessen the population. The Arabians under Caliph Omar conquered Persia in 636 A. D., and thus the

CHALCEDONY CYLINDER: SIGNET OF DARIUS I.

religion of ancient Persia became supplanted by Mohammedanism. In 1387 Tamerlane conquered Persia with a horde of Mongols, and extended his reign from Hindustan to Asia Minor. At his death, in 1405, the country came under the dominion of the Turkomans, who reigned until 1501, when they were succeeded by Ismail Sufi. The latter pretended to be a descendant from Ali, son-in-law of Mohammed, and assumed the title of shah.

Teheran was made the capital of Persia in 1796, when Futtah Ali Shah removed his residence to that city. This sovereign carried on a disastrous war against Russia, and in 1828 was obliged to cede all of Persian Armenia to the czar. Later a dispute arose with the British regarding the sultanate of Herat, which was ceded to the latter in 1857, but subsequently some territory formerly belonging to Oman was annexed. Teheran is the capital. Other cities of importance include Kerman, Tabriz, Meshed, Ispahan, Yezd, Barfurush, Shiraz, Kom, and Hamadan. A large portion of the rural population consists of nomadic tribes of Kurds, Turks, Arabs, and Lurs. However, the population is constituted chiefly of Iranians or pure Persians, and the Turkish and Tartaric tribes known as Turanians. The religion is almost exclusively Mohammedan of the Shiite sect. At present there are not more than 800 Europeans in the country. The total population is estimated at about 9,000,000.

Many different but closely related dialects are spoken in Persia. The Iranian language is used most extensively. It includes a number of dialects and is grouped with the Aryan or Indo-European division of languages. The Zend-Avesta is the oldest writing. It is the sacred book of the Parsees (q. v.), and dates from the time of Zoroaster, though at present only a portion of the original is extant. Other writings include the Gathas, dating probably from the period between 1200 and 1000 B. C., which constitutes a part of the sacred Zoroasterian literature in a language closely allied to the Sanskrit of the Vedas. The language afterward became greatly modified, as is shown by the cuneiform inscriptions on monuments dating from the time of Cyrus. With the Mohammedan conquest other changes in language and literature occurred, but in the 9th century A. D. Persia again ascended to importance, and continued the predominating influence till the Mongols overran the country and destroyed much of its treasures in wealth and literature.

Modern Persia dates practically from the ascent of Ismail Sufi, and since that time the modern Iranian language has been gradually developing. The Arabic characters are used in writing, but four letters have been added. There is a literature rich in poetry, biography, and history. Rudagi, who flourished about the middle of the 10th century, is the father of Persian poetry, and Tabari of about the same period is the first great historian. Ausari, author of "Mamik and Asra," and Firdusi, author of the national epic, "Shah-Nameh," flourished in the 11th century. Omar Khayyam (died 1123) wrote the celebrated lives of saints, entitled "Pend-Nameh." Saadi, the great didactic poet, flourished in the 13th century, and Hafiz, the most captivating of Persian poets, wrote in the 14th century. Fericht Ferichtah, who lived in the early part of the 17th century, wrote historic works of great value. Many of the legends of Persia have been translated into numerous European languages, while their drama is the most noted extant in Asiatic countries. Much of their knowledge of astronomy was secured from the Arabs, but their original works in religion are both numerous and superior. Their dictionaries and texts on grammar are abundant, while they possess excellent and authoritative works on geography and geology. Persia had few great writers after the 18th century. Ferid Ghafer Khan, who enriched literature by collections of Oriental fairy tales, is among the latest of note. Within recent years many translations have been made from European languages.

PERSIAN GULF, an inlet from the Indian Ocean, situated between Persia and Arabia, and connected with the Arabian Sea by the Strait of Ormuz. It is about 575 miles from north to south, about 185 miles wide, and contains a number of islands, among them Ormuz and the Bahrein Isles. The shores are generally rocky, except in the northern part, where the Euphrates and Tigris enter by a vast delta. Both the fin and pearl fisheries are abundant. The gulf is valuable for navigation. Bushire is the principal seaport. The tide rises twelve feet at the Strait of Ormuz. In ancient times the Persian Gulf was known as the Sea of Babylon.

PERSIGNY (pẽr-seen'yĭ), **Jean Gilbert Victor Fialin**, noted statesman, born at

Saint-Germain-l'Espinasse, France, Jan. 11, 1808; died at Nice, Jan. 12, 1872. In 1826 he was admitted to the school of cavalry at Saumur, and two years later entered the military service as a hussar. His family name was Fialin, but he took the name Persigny in 1833, when he became a supporter of Napoleon. To further the interests of the latter, he published a journal devoted to the royalist cause, and actively carried on a personal campaign with energy throughout France and Germany. In 1836 he instigated a military rising at Strasburg and was arrested, but effected his escape. He joined Napoleon in his expedition to Boulogne, where he was again arrested, but secured his liberty after a brief period of confinement. His part in the Revolution of 1848 contributed largely to strengthen Napoleon, and by his influence the latter was placed in the presidency on Dec. 10, 1849, while he aided to hasten the events by which Bonaparte became Napoleon III., in 1851. In 1852 he was made minister of the interior; in 1855 he became ambassador at the English court, and in 1869 he was recalled to resume the office of minister of the interior. Napoleon created him a duke in 1863, and subsequently he served in the senate till 1870, when the empire was overthrown.

PERSIMMON (pĕr-sĭm'mŭn), a tree of the ebony family, native to America, and abundant in the southern United States. It attains a height of from twenty-five to sixty feet, and yields a plum-like fruit about an inch in diameter. It has from six to eight seeds, and is astringent and bitter to the taste until made sweet and mellow by the frost. The fruit is edible. Tonics and astringents are prepared from the bark of the tree.

PERSIUS (pĕr'shĭ-us), **Flaccus Aulus,** famous Roman poet and satirist, born in Etruria in 34 A. D.; died Nov. 24, 62. He descended from a celebrated equestrian family, was educated at Rome under the Stoic philosopher, Cornutus, and there became associated with the most eminent men of his time. Persius is noted as the author of six satires, which have been renowned from his own time down to the present. Their value lies largely in the sternness with which the corruption of morals prevalent at Rome is censured, and in their excellent literary style and language. These satires have been printed largely with those of Juvenal, and they have been favorably commented on by Jerome, Augustine, and other fathers of the church. Some of his writings are borrowed from other authors, but all are touched with a vein of originality, and the dialogues employed are the most dramatic found in Latin writings. Many translations have been made, including twenty-five into German, twenty into French, and fourteen into English.

PERTH, a city in Scotland, capital of a county of the same name, on the Tay River, forty-two miles northwest of Edinburgh. The Tay is crossed by a fine bridge of nine arches, 880 feet long. Perth has a beautiful site on the banks of the river, where the scenery is beautified by the Grampians and by excellent forests and parks. It has extensive railroad connections, a city water system, street railways, pavements, and other municipal facilities. Among the manufactures are spirituous liquors, machinery, textiles, dyes, and utensils. The salmon fisheries of the Tay are valuable, and at Perth much of the product is canned. The city has a number of excellent public buildings, including the Church of St. John, the King James VI. Hospital, a penitentiary, a library building, and a number of educational institutions. It is thought that Perth was founded by the Romans. It was the capital of Scotland till 1437. Population, 31,325.

PERTH AMBOY, a city and port of entry of New Jersey, in Middlesex county, on the Raritan River and Bay, twenty-one miles southwest of New York City. It has excellent railroad and steamboat connections, and in its vicinity are valuable deposits of kaolin and fire-clay. Among the manufactures are terra-cotta, cork, emeryware, chemicals, tobacco products, oil, and drain tile. The general facilities include electric lights, pavements, excellent schools, numerous churches, and a young ladies' seminary. The city has a large trade in cereals and merchandise. Population, 1900, 17,699.

PERU (pē-rōō'), a city in La Salle county, Illinois, on the Illinois River, one hundred miles southwest of Chicago. It is well connected with other cities by railroads, and is the terminus of the Illinois and Michigan Canal. The surrounding country is agricultural, producing cereals and dairy products, and contains extensive deposits of bituminous coal. Among the manufactures are flour, hardware, cigars, machinery, farming implements, and lumber products. The city has two public parks, fine school and church buildings, and is lighted by gas and electricity. It has a growing trade in merchandise. Population, 1900, 6,863.

PERU, a city in Indiana, county seat of Miami county, seventy-five miles north of Indianapolis. It is finely located on the Wabash River, and has good railway connections with the larger trade centers of the west and east. It is surrounded by a rich farming and dairying country. Among the manufactures are textiles, artificial ice, carriages, flint glass, ironware, flour, machinery, and bags. The city has a fine system of public schools and excellent church buildings. It enjoys the advantages of modern municipal facilities, such as waterworks, a fire department, electric lighting, and street railways. Natural gas and coal are found in its vicinity. Population, 1900, 8,463.

PERU, a country of South America, whose northern boundary is formed by Ecuador, eastern by Brazil and Bolivia, and southern and western by Chile and the Pacific

Ocean. The total area is placed at 663,747 square miles. The surface varies greatly, both in its composition and elevation above sea-level. A narrow coast plain lies along the Pacific, and about sixty miles inland the Andes Mountains trend almost parallel to it. San Lorenzo is the largest island belonging to Peru. In the eastern part stretches a vast region included in the Amazon basin, through which many streams flow toward the east. The Andes Mountains are formed of two main chains or cordilleras, between which connecting ranges trend, and these are diversified by plateaus and valleys. Fully two-fifths of the surface is occupied by the highlands and mountains. The mountains rise to a height of from 20,000 to 21,000 feet, Chuquibamba being the most elevated. The Amazon basin in Peru is known as Montana, or Los Bosques, and abounds in dense forests and other forms of luxuriant vegetation. Several beautiful lakes are in the mountain regions, including Lakes Junin and Titicaca, all of which are more or less valuable for their fisheries. The latter has an elevation of 12,540 feet above sea-level. It is the most important inland lake of South America, and belongs partly to Bolivia. The rivers west of the Andes are short and have a rapid descent into the Pacific Ocean, while those east of these mountains belong exclusively to the Amazon system. The principal streams include the Amazon, here also called Maranon, and the Huallaga, Ucayale, Urubamba, Apurimac, Paucartambo, and Purus rivers.

The rainfall is greatly diversified, owing to the varied effects of altitude and trade winds. On the coast region rain seldom falls, for the reason that the trade winds sweeping across the Atlantic exhaust their supply of moisture in passing over the Cordilleras, hence that region is dry and arid, and the rivers are practically the only source from which water can be drawn for irrigating cotton and sugar plantations. In the mountains and the Amazon basin rainfall is abundant. The climate of the coast is hot, but is somewhat modified by the winds blowing from the snow-capped Andes, and by cold oceanic currents. Many of the valleys in the mountain regions are productive and have an excellent climate, though some are rocky and sandy. Peru still possesses an extensive and remarkable fauna of animal life, including the sloth, ant-eater, tapir, armadillo, boa-constrictor, alligator, monkey, alpaca, llama, guanaco, and many species of beautiful birds of song and plumage. The birds include the condor, hawk, turkey buzzard, toucan, pheasant, and humming bird.

The productions of Peru vary according to location and altitude. In the Amazon basin vast tropical forests of valuable woods are abundant, and the mountain regions abound in great mineral wealth. Agriculture and mining are the principal industries. The chief crops embrace cotton, sugar, and coffee, but there are considerable productions of potatoes, tobacco, cocoa, rice, maize, wheat, barley, and other cereals. Various medical plants and dye-woods obtained in Peru possess great value, and the productions of wines, spirits, alpaca, guano, and many varieties of tropical fruits are important. The mineral wealth includes gold, silver, zinc, copper, mercury, salt, sulphur, petroleum, nitrates, and coal. As a whole the manufactures are limited, the principal productions being sugar, textiles, tobacco products, spirituous liquors, clothing, and utensils. Peru has vast interests in exports and imports. Its commercial activity has been greatly augmented within late years by the construction of railroads and highways. Most of the highways are in poor condition, and consist principally of paths used in transferring goods by pack mules. The telegraph lines include about 8,500 miles; the telephone, about 5,200 miles; and the railroads, 2,100 miles, most of which belongs to the general government. Railroad and highway construction is extremely difficult in the mountain regions, owing to their vast elevation and their rocky and craggy character, thus requiring great engineering skill in promoting these enterprises. The Upper Amazon and its leading tributaries are navigable for boats of small size.

Equal political and religious freedom is guaranteed under the constitution, but the Roman Catholic Church is the state religion. While other sects have not been excluded, it is required by law that the state religion be respected. A system of public schools is maintained under national laws, and the high schools are generally under departmental supervision. Attendance at schools is nominally obligatory, and they are alike free to natives and foreigners. At Lima are schools of mines and civil engineering, and the University of San Marcus, which has departments of theology, law, science, medicine and economics. Universities are maintained at Cuzco and Arequipa, and several botanical and zoölogical gardens are supported at Lima. The government is modeled after that of the United States, and is limited by a constitution revised in 1860. Executive power is vested in a president, who is elected by popular suffrage for four years, and two vice-presidents are elected to take his place in case of incapacity or death. The presidential cabinet consists of six ministers, who are appointed by the president. The legislative authority is vested in a senate and house of representatives, and the judicial in a system of courts. Its regular army in the time of peace includes 3,500 officers and men, the former securing training at a military school in Chorillos, near Lima. The navy consists of twelve vessels, but most of them are not modern in construction. The sole is the monetary unit, and is equal to seventy-seven cents in United States. In 1900

Peru adopted the gold monetary standard. Spanish is the national language, though the Peruvian is still spoken by a large per cent. of the people. At present seventy-five periodicals, mainly newspapers, are published, most of which are in Spanish.

Little is known of the ancient history and civilization of Peru. Writers generally divide its history into three periods: the Pre-Incarial, the Incas, and the Spanish periods. The Pre-Incarial period includes a time of unknown duration, when the region was populated by a people who were highly advanced in language and civilization and built vast cities. Traces of this period are abundant near Lake Titicaca and elsewhere, and occur in the form of sculptures, pillars, immense masses of hewn stone, ornaments, and fragments of buildings. Nothing is known of the origin of the Incas, but they are thought to have been less advanced in civilized arts than the people who preceded them, and when the Spanish invaders conquered the region, their cities and industrial arts had peculiar development. At that time the region now included in Peru had a population of fully 30,000,000 people. Pizarro with a band of Spanish adventurers invaded Peru in 1532, and before the end of the year captured Athualpa, the Incas sovereign, and destroyed his power.

From the conquest by Pizarro until 1821 Peru was a Spanish possession, but in the latter year independence was proclaimed. However, Spanish dominion did not terminate until 1824, when a prolonged war ended favorably to the revolutionists. A constitution was adopted soon after, which was supplanted by the constitution of 1856, and that was revised in 1860 and modeled after the constitution of the United States. Peru and Bolivia formed an alliance against Chile in 1879, which resulted in the success of the latter, and accordingly Peru ceded by treaty, in 1883, the province of Tarapaca to Chile. This cession was a heavy loss, because the province contains vast deposits of nitrates and other valuable minerals. Since then several unimportant insurrections have occurred, but in the main the government has been stable and the country reasonably prosperous. Lima is the capital and the largest city. Other cities of importance are Callao, Arequipa, Cuzco, Ayacucho, Concepcion, and Catacaos. The entire population of Peru is estimated at 4,850,000, of which 350,000 are Indians and 25,000 Chinese.

PERUGIA (pă-rōō'jä), a city of Italy, situated on the Tiber River, ten miles east of Lake Perugia, and eighty-three miles north of Rome. It is the capital of the province of Perugia, which is highly fertile. The city is surrounded by fortifications, and contains a number of massive buildings, among them a Gothic cathedral built in the 15th century. Its university was founded in 1320. This institution has a fine museum, carries advanced courses of study, and has a library of 80,000 volumes. Among the manufactures are silk and woolen goods, velvets, liquors, soap, utensils, and machinery. The railroad connections with Rome, Florence, and other cities make it an important market for various manufactured products. Perugia was anciently an Etrurian republic, but in 294 B. C. it became a part of Rome. In 1860 it was made a part of Italy by Victor Emmanuel, and since then it has benefited greatly by railway building and other improvements. Population, 50,175.

PERUGINO (pă-roo-jee'no), **Pietro Vannucci**, noted Italian painter, born in Umbria, about 1446; died near Perugia in December, 1524. He first studied at Perugia, from which city he received his name, and later he was instructed in Florence under Andrae Verocchio. About 1480 he established himself at Rome, where he was employed by Pope Sixtus IV. to decorate with frescoes the Sistine Chapel. His fresco entitled "Christ Giving the Keys to Peter" is one of the finest in that building. Other productions that have made his name famous are still preserved in Bologna, Perugia, Rome, and Florence, and in a number of European galleries are specimens of his paintings. Raphael was for a time a student with Perugino.

PESSIMISM (pĕs'sĭ-mĭz'm), the name applied to a doctrine announced by Schopenhauer in 1819, which implies the theory that the world is bad rather than good. It stands directly opposite to optimism, in that the optimist sees the good and beautiful in everything, while the pessimist maintains an unfavorable view of everything in nature and doubts whether life is worth living. The view that vast evils exist to overshadow the good has been associated with nearly all philosophic and religious systems at some stage in their development. Anciently the Greeks had doubts as to the reality of knowledge and good, while the Brahmans and Buddhists regard life illusory and burdensome. Rousseau agreed with the doctrine expressed by some of the Greek philosophers that the world is degenerating. Schopenhauer thought that the world is the worst possible under existing conditions, and that life should be a denial and suppression of will. Eduard von Hartmann (born 1840) expressed the view that the world is wholly bad, but he regarded it the best under metaphysical limitations. He thought that will is a craving to exist, involving much suffering, and that ultimately it will cease existence altogether. The tendency to look on the dark side, though holding that there are both good and evil in the world, may be assigned to the fact that many individuals spend much time in contemplating unhappiness and actual pain, and in realizing that the ideals of the human soul are superior to the conditions actually experienced. That life is worth living is proven by our desire to live, and that pleasure exceeds pain is evidenced

by our experience, but its realization is often interfered with by brooding over trifling or apparent losses. Pessimism as a doctrine is good so far as it teaches that the highest reward of virtue is self-respect and points out barriers to happiness in this life, particularly if it seeks to remove these barriers by wise methods.

PESTALOZZI (pĕs-tä-lŏt'see), **Johann Heinrich**, German educator and educational reformer, born in Zurich, Switzerland, Jan. 12, 1746; died in Brugg, Feb. 17, 1827. His mother was left a widow with three children in 1751, and under her direction he received a rather sentimental and unpractical education. It was his custom to be touched by feeling and emotion, rather than by reasoning and reflection, and he accordingly became an object of sport among his companions. In 1760 he entered the academy and there distinguished himself by political enthusiasm, and was led to see the needs of the people educationally and socially. He developed a taste for a simple and frugal life, and was especially fond of life in the open air. This caused him to take much delight in spending his vacations in the country at his grandfather's, who was a minister at Hoengg. At first he designed to enter the ministry and later to study law, but he was unsuccessful in both and decided to become an agriculturist, which he did at Neuhof by purchasing some waste land. It was his design rather to improve the material conditions of the peasants by developing a new industry, than to enrich himself. In 1769 he married Anna Schultess, the daughter of a wealthy merchant, but in 1775 his financial resources were exhausted. It now became his ambition to improve the educational status of poor children at Neuhof, and accordingly he opened an asylum on his farm, which was at first successful, but failed in 1780.

JOHANN H. PESTALOZZI.

After the failure of this educational enterprise, Pestalozzi devoted himself to writing, hoping thereby to secure an improvement for the people educationally. In 1780 appeared "The Evening Hours of a Recluse." The first volume of "Leonard and Gertrude" was published in 1781, and soon after he completed his "Researches on the Course of Nature in the Development of the Human Race." He returned to farming in 1787 and engaged in that occupation for a period of ten years, and in the meantime became the founder of several agricultural institutes, organizations in which the peasants met for the purpose of discussing various topics in relation to their industry. In 1798 he established the orphan asylum at Stanz, in which he hoped to put into practice his principles of education, and when he was offered the position of director in a normal school he declined it to remain a teacher at the asylum. This enterprise was discontinued in 1799 by a war that then affected his country, but before the close of the same year he established himself as teacher of a primary school in Burgdorf. The last of the four educational schools established by him was the institute at Yverdun in 1805. This institution was located at the foot of Lake Neuchatel, in French Switzerland, and was for a number of years not only highly successful, but excited the admiration of many distinguished visitors. While there he published "Book for Mothers," and completed "Gertrude." His institute at Yverdun began to decay and was finally discontinued in 1825. Pestalozzi returned to the farm at Neuhof soon after, and there wrote "Swan's Song" and "My Destinies." He attracted the attention of all the leading educational thinkers and writers of Europe by his excellent methods and theories of education, and from him teachers still draw inspiration for their work more largely than from any other writer.

Among the many meritorious theories of Pestalozzi may be mentioned the view that to know the end is to find the way, and to be possessed with an impulse to reach an end is to make a way. He had impulses of the highest and noblest kind which animate the human soul, but lacked that studious insight which leads to the development of a correct method. While he was an unsurpassed educator, he was not a successful teacher, and the story of his devotion to the study of the nature of children and the desire to better their condition is one of the most pathetic in the history of education. He was buried at Birr, at which place the canton of Argovia erected a monument to him in 1846, with the following inscription: "Here lies Henry Pestalozzi, born at Zurich, Jan. 12, 1746; died at Brugg, Feb. 17, 1827. Savior of the poor at Neuhof, preacher of the people in 'Leonard and Gertrude,' father of orphans at Stanz, founder of the people's school at Burgdorf and Munchen-Buchsee, educator of humanity at Yverdun, man, Christian, citizen: everything for others, nothing for himself. Blessed be his name."

PESTH. See **Budapest.**

PETARD (pē-tärd'), an instrument used formerly for making breaches in walls of forts, and for destroying gates and palisades. It was made of a conical iron, in which from five to twelve pounds of powder were placed, and, after attaching it to the object to be demolished, a slow-match was applied to the touch-hole at the small end. Powder bags are now used almost universally in place of petards.

PETER, Saint, originally called Simon,

an apostle of Jesus, born in Bethsaida, a town on the Sea of Galilee. Both he and his brother Andrew were fishermen, and after Jesus called them to become disciples and fishers of men they appear to have lived together at Capernaum. Jesus added Cephas to his original name Simon, the former being from the Syriac kepha, meaning a rock, and the Greek word of the same meaning is petra, hence he became known as Peter. The gospel narrative of the life of Peter leads to the conclusion that he was held in special esteem by Jesus, and his zeal and eloquence often made him the speaker on important occasions. The last mention of him in the Scripture is made in connection with the council of Jerusalem in 49 A. D. All subsequent knowledge is based on tradition. While Paul was the special teacher of the gentiles, Peter applied himself with equal zeal to the conversion of the Hebrew race, and he is credited with having preached in Cappadocia, Pontus, Galatia, Bithynia, and Rome. His ministry was chiefly to those of his own nation who were dispersed in these countries, all the cities but Rome being named in the first of the two epistles which he wrote. The Christian churches hold his opinions of much importance. Most writers think that he visited Rome as early as 43, and that he finally settled there in 63 A. D., while his martyrdom is generally fixed in the year 66, at the same time and place at which St. Paul suffered death. Eusebius stated that Peter was sentenced to be crucified, and at his own request was nailed to the cross with his head downward, this being asked in order that his martyrdom might not be honored by being exactly like that of his Lord.

PETER I., called Peter the Great, Alexeievitch, emperor of Russia, born in Moscow, June 11, 1672; died Feb. 8, 1725. He was the son of CzarAlexei Mikailovitch, who died in 1676. The throne was left to Feodor, half-brother of Peter, who died in 1692 without issue, and who named Peter as his successor for the reason that Ivan, his full brother, was weak-minded. His mother, Natalia Kirilovna, became the regent of Peter, but an insurrection was at once organized by the children of Alexei's first marriage. The insurrectionary forces were mainly under the direction of Gra d-duchess Sofia, sister of Ivan, and the latter was finally crowned emperor with Sofia as regent. Peter was placed under the instruction of Franz Timmerman, a native of Strasburg, who taught him mathematics and military art, and developed his physical powers by gymnastic exercises. Later he studied the sciences and arts of civilization under a native of Geneva, Switzerland. Thus equipped in educational arts and military sciences, Peter called upon Sofia in 1689 to resign the government, and refusing to do this, she was confined in a convent until her death in 1704.

PETER THE GREAT.

Peter the Great allowed Ivan to govern nominally, while he was virtually the sole emperor, and in 1696 the former abdicated. Once in supreme command, he immediately began to plan the development of Muscovite power. He reorganized and disciplined the army, invited engineers and architects from abroad to aid in the construction of highways and public buildings, and personally visited the Netherlands to become acquainted with naval arts. The greater part of his time in 1697-98 was spent in the shipyards of Holland and England, that he might become acquainted with all the intricacies of shipbuilding and navigation, while at the same time he provided funds from the public revenue to enable young men to travel in foreign countries for the purpose of coming in touch with agricultural arts, stock-raising, manufacturing, commercial enterprises, road and canal building, and the platting of cities. Some of these young men studied military arts in Germany, others philosophy, astronomy, surgery, geography, anatomy, metallurgy, and commerce in the various institutions of different countries. William III. invited Peter to visit England, and while there he mingled freely with artisans and laborers in different lines, and received a degree from Oxford University. Returning to Russia, he required Charles XII. of Sweden to cede the Baltic provinces, and created a navy, built seaports, and constructed vast canal systems. Previously all accounts in Russia had been kept by the abacus, but Peter introduced arithmetic, reformed dress and manners, and equipped schools. To promote improvements in these lines he invited teachers and artisans of all kinds to his dominion.

Peter laid the foundation of St. Petersburg on May 27, 1703. On July 8, 1709, he gained the battle of Pultowa against the military forces of Sweden, and the following year annexed a part of Finland. He married Catharine (q. v.) on March 2, 1712, at St. Petersburg, and two months later the capital was moved to that city from Moscow. He made an extended visit to European countries in 1716-17 in company with the czarina, and soon after established the Academy of Sciences at his capital. Peter was ever zealous in carrying forward improvements, but was greatly irritated by the least opposition. His son, Alexis, became implicated in a scheme to oppose some of the reformatory plans, and accordingly was tried on a charge of treason and condemned

to be executed, but died before the time set for the execution. In 1722 war was declared against Persia for the purpose of opening the Caspian Sea to commerce, which resulted in the annexation of the cities of Baku and Derbend and three provinces to Russia. In the same year he established the law of sovereign succession, by which the czarina became recognized as the heir apparent to the throne. His empress was crowned as Catharine I. shortly after his death.

PETER II., Alexeievitch, emperor of Russia, grandson of Peter the Great, born in St. Petersburg, Oct. 23, 1715; died there Jan. 9, 1730. He was the son of Alexis, the only male representative of Peter the Great. Catharine I. died May 17, 1727, when he was crowned emperor in accordance with a decree of Peter the Great. He became afflicted with smallpox about two years after his coronation and died soon after. He was succeeded by Anna, the daughter of Ivan, half-brother of Peter the Great.

PETER III., Feodorovitch, emperor of Russia, grandson of Peter the Great, born in Kiel, Germany, Jan. 21, 1728; assassinated July 14, 1763. He was the son of Anna Petrovna, eldest daughter of Peter the Great, and was declared the successor to the throne of Russia by Czarina Elizabeth in 1742. Immediately he took up his residence at the Russian court, and married the German princess, Sophia Augusta, who assumed the name of Catharina Alexiewna. On the death of Elizabeth, in 1762, he succeeded to the throne. He withdrew from the alliance made by Russia, Austria, and France against Prussia, sent an army of 15,000 men to aid Frederick II. of Prussia, and restored to him East Prussia, a region annexed after the Seven Years' War. Soon after he recalled many of the Siberian exiles. He next formulated a plan to obtain Schleswig from Denmark, but before the design could be carried out a conspiracy against him was planned by his wife. The two lived unhappily together, and in 1762 Catharine had herself declared empress. This course came about by Peter's friendship for the king of Prussia, and because he had been liberal in regard to the church and internal affairs. Peter showed a remarkable want of energy in suppressing the insurrection that followed, and took decisive measures only when it was too late. The conspirators removed him to Ropsha, where he was forced to abdicate, and was afterward strangled by Orloff, one of the conspirators. His wife succeeded him as Catharine II.

PETER THE CRUEL. See Pedro the Cruel.

PETER THE HERMIT, apostle of the first Crusade, born at Amiens, France, about 1050; died at the monastery of Huy, in the diocese of Liege, July 7, 1115. He descended from a good family, was educated at Paris and in Italy, and shortly after entered the army for service in Flanders. Later he retired from the army, and after the death of his wife, became a monk and later a hermit. In 1093 he made a pilgrimage to Palestine, where he was deeply impressed by the desperate condition of the Christians and by seeing the holy sepulcher in the possession of infidels. Soon after he visited Pope Urban II., who authorized him to preach in western Europe for the purpose of organizing a confederation of Christians to possess the Holy City. After preaching for some time, an army of 30,000 men was secured, with which he marched through Hungary under continuous attacks by the Hungarians. Later he was assisted by Emperor Alexis at Constantinople. However, he met defeat in a battle against Sultan Sulyman, and at the siege of Antioch decided to abandon the scheme of conquering Jerusalem, but was induced by other leaders to continue the enterprise. Jerusalem was captured by his forces in 1099. The closing incident of this Crusade was a sermon by him from the Mount of Olives to the victorious army. Soon after he returned to Europe and founded the monastery at Huy, of which he was the first prior.

PETERS, Christian Henry Frederick, noted astronomer, born in Schleswig, Germany, Sept. 19, 1813; died in Clinton, New York, July 19, 1890. He studied at the University of Berlin, and after spending several years in foreign travel, located in the United States, receiving a position on the government coast survey. In 1858 he was elected professor of astronomy at Hamilton College, and at the same time was director of the Litchfield Observatory, at Clinton, New York. He was selected to conduct a party to New Zealand in 1874 to observe the transit of Venus. During his service as director the Litchfield Observatory was greatly improved and he added materially to its equipments. He recorded 20,000 spots on the sun, discovered a large number of asteroids, and investigated the orbit and nature of many comets. The catalogue prepared by him contains the record of 16,000 zodiacal stars.

PETERS, Karl, explorer, born in Hanover, Germany, Sept. 27, 1856; died in Masailand, Africa, in September, 1889. He studied at Göttingen, Tübingen, and Berlin, and in 1883 published several works on philosophy. The following year he was authorizied by the government to conduct expeditions to and found colonies in German East Africa, and was elected president of the German East Africa Society. Later he operated with Emin Pasha in equatorial Africa, where he afterward met his death. He published several valuable reports on the climatic conditions and the nature of the soil prevailing in the regions visited by him.

PETER'S, Saint, the largest cathedral in Christendom, situated in Rome, where it was founded by Julius II. in 1506. It occu-

pies the site of the old basilica, which was built by Constantine the Great in 306 A. D. on the grave of St. Peter, and near the place where he suffered martyrdom. The building of a magnificent cathedral had been projected by Pope Nicholas V. in 1450, but Julius II. was the first to take decisive measures and selected Bramante as the architect to make a design. This architect died in 1513, and others had charge of the work until it devolved on Michael Angelo in 1546. He was seventy-two years of age when he commenced the important work of completing the structure. He designed the dome, and before his death, in 1564, had the satisfaction of seeing the dome and most of the building practically completed. In 1612 the nave was completed; the façade and portico in 1614; and the building was dedicated on Nov. 18, 1626, by Urban VIII. The façade is 145 feet high and 368 feet long. Saint Peter's has a length of 613 feet, breadth across the transepts 445 feet, and the nave is 152 feet high and 90 feet wide. The dome has a diameter of 195 feet; the height to the lantern is 405 feet, and to the top of the cross 435 feet. Copies of the most celebrated paintings extant are in the cathedral, and the whole is a work of much magnificence and a fine product of architectural skill. Four great arches support the dome, the finest portion of the building. A high altar is immediately under the dome, where the grave of St. Peter is located. Monuments by Canova, Angelo, and Thorwaldsen adorn the building, besides which it has a large number of statues and beautiful works of art. The cost of the cathedral is estimated at $50,000,000.

PETERSBURG, a city of Virginia, in Dinwiddie county, on the Appomattox River, about twenty miles south of Richmond. It is surrounded by a region containing granite quarries and productive agricultural lands. It has convenient railroad facilities, electric lights, waterworks, street railways, several libraries, and good public schools. Among the institutions of higher learning are the Southern Female College, St. Paul's Female College, and the Protestant Episcopal School for Girls. The manufactures include tobacco products, flour, paper, cotton and silk textiles, machinery, and farming implements. It has a very extensive trade in tobacco, cotton, flour, and paper. In 1864 it was besieged for ten months by the Union forces under General Grant, and in the spring of 1865 it was evacuated by the Confederates. Population, 1900, 21,810.

PETER'S PENCE, or **Romescot**, a tax levied in memory of St. Peter for the benefit of the pope. It is thought to have originated with Ina, king of Wessex, in 721. The tax was paid by those possessing cattle or land, but was discontinued in England in 1365, and in 1534 it was prohibited by an act of parliament. The tax was only one penny for each family, but this was really a large amount, as the value of a day's labor was only a penny. When the pope lost temporal power by the Revolution of 1848, the tax was revived as a voluntary contribution in several countries, and there have been large funds accumulated in this manner. In 1877, when the jubilee of Pius IX. was celebrated, the sum raised amounted to $3,300,000.

PETRARCH (pē'trark), **Francesco**, distinguished poet and scholar, born in Arezzo, Italy, July 20, 1304; died July 18, 1374. His parents were exiled from Florence at the time of his birth along with Dante and others, and his early life was spent in Tuscany. His father removed to Avignon in 1312, where young Petrarch secured his early education, but later studied law at Montpellier and Bologna. After the death of his father, in 1326, he returned to Avignon for the purpose of devoting himself to the study of Latin classics, and in the meantime took a course in theology, but not particularly with the view of taking holy orders. On April 6, 1327, he met Laura, a golden-haired French woman, for whom he immediately developed a pure and tenderly romantic passion. She was then nineteen years of age, and had been the wife of Hugo de Sade, a gentleman of Avignon, for two years. Ever after he sang of his Platonic love for this woman, and frequently met her in society and at church. The sonnets of love were so beautiful that they charmed his contemporaries, and led Charles IV. to seek an introduction to the object of the poet's praise.

In 1338 Petrarch left Avignon for Lombez, where he spent most of his time in literary pursuits. His learning and genius attracted the attention of the leading scholars of his time, his Latin works being those upon which his fame principally rests. In 1341 he visited Rome, and while there on Easter Day the senate crowned him with the wreath of the poet laureate. His scholarship was as profound as his poetic genius was remarkable, and he spent much time in traveling in different countries to collect materials for his writings, visiting in the meantime the chief cities of Italy, Spain, Germany, and France. While at Parma he was informed of the death of Laura, of which he made note on his copy of "Virgil." He finally settled at Argua, near Padua, where he spent the closing years of his life in constant literary work. His life and writings exhibit a rational piety, and among his productions are some of such value that he is regarded by many writers as one of the most important figures in the revival of learning. The principal works include his "Epistolæ," containing his letters to friends and acquaintances; "Africa," an epic poem on the subject of the Second Punic War, and many excellent poetic works. Many translations have been made from the works of Petrarch, and there are a number of extensive commentaries based on his writings.

PETREL (pĕt'rĕl), a genus of sea-birds.

They include many species, all of which have webbed feet and long and strong wings. The nasal tubes are united, the beak is as long as the head, and the upper mandible is hooked. They live almost constantly on

STORMY PETREL.

the ocean. The petrels that frequent the high seas are rarely seen on the land, coming to shore only to lay their eggs and rear their young. The color is dusky and varied with white or gray, and most of the species are of small size. They feed on mollusks, and may be seen upon the water when it is disturbed by storms, for the reason that many of the animal forms upon which they feed rise to the surface at that time. Among the common varieties are the stormy petrel, the cosmopolitan Wilson's petrel, and the northern Leach's petrel. The stormy petrel is sometimes called Mother Cary's chicken, and is one of the smallest web-footed birds, being only about the size of a lark. These birds are so named because they appear to be walking or running on the water, the term being applied from the Apostle Peter's walking on the water.

PETROLEUM (pĕ-trō'lē-ŭm), an inflammable liquid substance found in many localities by boring into the earth's crust, but in some places it rises through natural channels and forms springs. It is frequently called mineral oil, rock oil, coal oil, natural oil, and seneca oil, the names differing in the trade of different countries. To secure petroleum wells are sunk into the earth by drilling tools, much like those used for artesian wells. The depth differs greatly with localities, ranging from a few feet to several thousand feet below the surface. The oil comes to the surface in some localities, being forced out by a gas always found in connection with it, but in some cases it must be pumped much like water from an ordinary well. Crude petroleum is of a dark brown to greenish color, and in its native state has a disagreeable odor. From the wells it is transferred into great tanks by means of iron pipes, and it is then taken through pipes into refineries, where it is distilled. In some of the Pennsylvania and Ohio oil regions several thousand miles of pipes are used to carry it to the refineries.

The crude petroleum yields different classes of products by distillation, the principal ones being gasoline, naphtha, benzine, kerosene, lubricating oil, and paraffin. Gasoline is used for mixing with coal gas and making gas; naphtha, for making oilcloths and cleaning kid gloves and clothing; benzine, in making varnishes and paints; kerosene, for burning in lamps; lubricating oil, for oiling or greasing machinery; and paraffin, for making waterproof cloths, chewing gum, candles, and matches. Petroleum is used to a considerable extent as fuel for furnaces and engines, but it is somewhat objectionable on account of being extremely smoky. In some regions a large amount of gas accompanies petroleum, when it is used extensively for lighting purposes. See **Natural Gas**.

Petroleum was known to the ancients, but it was not produced to any considerable extent until 1859, when a boring at Oil City, Penn., led to the discovery of a well that yielded 400 gallons a day. Pliny describes its use in lamps, and Genoa was lighted by the product secured from the wells of Amiano at about the time of Tacitus, Pliny, and other Roman writers. The American Indians collected petroleum that exuded from the ground, which they sold as seneca oil for various medical purposes, especially

OIL WELL FLOWING.

for rheumatism. Geologists generally agree in the opinion that petroleum has been formed by the decomposition of organic matter, either of animal or vegetable origin. However, some writers think it was formed in the depths of the earth by the chemical

action of water on heated carbides. It occurs in rocks of all ages.

The United States and Russia are the largest producers of petroleum, and the productions in these countries have been about equal for some years. Petroleum is also found in Canada, Persia, Austria, Burmah, and divers regions of Asia. The principal oil wells of the United States are in Pennsylvania, West Virginia, California, Kansas, Ohio, Texas, Tennessee, Kentucky, Wyoming, and New York. Deposits have been discovered in several other states and in Alaska. The American product is considered the most valuable, since it yields a larger proportion of refined oil per barrel, and sells about ten per cent. higher than that produced in competitive countries. The annual production of the United States is about 62,500,000 barrels, and has a value of $74,500,000. Much of this product is consumed in the manufactures and for household uses, while a large per cent. is exported annually. It is equally serviceable for lighting and heating.

PETTIE (pĕt'ĭ), **John**, painter, born in Edinburgh, Scotland, in 1839. He studied in the Royal Scotch Academy, and soon after made exhibits in Edinburgh and London. His works of the highest quality include "Witchcraft;" "Disgrace of Cardinal Wolsey;" "Drumhead Court-Martial;" "Prison

PETUNIA.

Pet," and "Jacobites in 1745." His death occurred at Hastings, Feb. 21, 1893.

PETTIGREW (pĕt'ĭ-grōō), **Richard Franklin**, public man, born in Ludlow, Vermont, in July, 1848. In 1854 his parents removed to Wisconsin, where he attended the Evansville Academy, and in 1866 he entered Beloit College. In 1869 he graduated from the University of Wisconsin and the same year located in Sioux Falls, South Dakota, where he began the practice of law. He was elected to the Dakota legislature shortly after, and in 1881 was elected as delegate to congress from Dakota territory. When South Dakota was admitted as a state, he was elected to the United States senate, and was reëlected in 1895. Pettigrew ranked as an active and influential member of congress.

PETUNIA (pĕ-tū'nĭ-ȧ), a genus of plants of the nightshade family, which are native to the warmer parts of America. The leaves are entire, and somewhat resemble those of tobacco, especially in having a sticky surface and in emitting a disagreeable odor when crushed. The plants are perennial herbs, and the flowers are either single or double. They are cultivated extensively in gardens and in greenhouses, where they are grown chiefly as annual plants, since they bloom early. The "Countess of Ellesmere" is a choice variety with a deep rose-colored flower. Other favorite species have been developed by florists.

PHÆDO, or **Phædon**, Greek philosopher, who flourished in the time of Socrates, about the 4th century B. C. He was of noble birth, a native of Elis, but was taken captive and sold as a slave in Athens. Afterward he was released through the influence of Socrates, who became his firm friend. His name is given by Plato to the dialogue on the death of Socrates. After the death of the latter, he returned to Elis and founded the Elean school of philosophy.

PHÆDRUS (fē'drus), a Latin poet and writer of fables, born about thirty years before the Christian area. He was taken in childhood from Macedonia to Rome, where he became connected as a servant with the court of Augustus, by whom he was freed. Besides translating many of Æsop's fables from the Greek into the Latin, he wrote a large number of original fables and poems. Ninety-seven fables ascribed to him are extant.

PHAETHON (phā'ē-thŏn), or **Phaeton**, in Greek legend, the son of Helios, the sun-god, and of Clymene. He is described as a beautiful youth, but his heart was filled with vanity. At his persistent entreaty Helios permitted him to attempt to drive the chariot of the sun for one day. When Dawn, the sister of Helios, opened the doors of the rosy east the horses were yoked to the chariot and Phaëthon's face was anointed with a balm so he could withstand the burning heat, and immediately mounted the chariot. As he was unaccustomed to the arts of a charioteer, the fiery steeds soon passed from his control, causing the mountains and forests of the earth to be set on fire. Zeus sent a thunderbolt to stop the steeds, which hurled the youth headlong into the Po River. His sisters, the Heliades, wept so long for him that Zeus transformed them into poplars, and their tears were converted into trans-

parent amber.—A light four-wheeled carriage is commonly called a phaëton.

PHALANX (fā'lănks), the order of battle in which the heavy infantry of Greece was formed. It consisted of a series of unbroken lines several ranks deep, usually from eight to sixteen ranks, and the men were armed with lances from eight to fourteen feet long. The Spartan phalanx was eight ranks deep, while the Theban and Macedonian were much deeper.

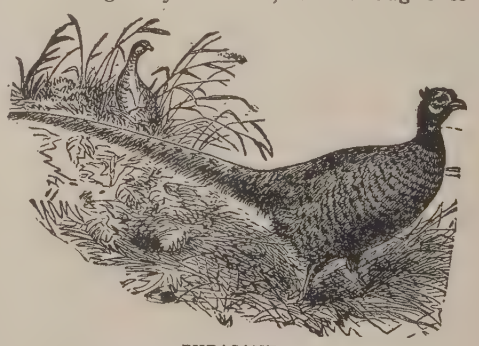
PHARAOH (fā'ra-ō), a name applied by the Scriptures and various Hebrew writers to the rulers of Egypt. It is used as if it were a proper name, but it is only an official title, as shah is a title of the Persian rulers. khan of the Tartars, and czar of the Russians. The title corresponds to the Ph-Ra found on the monuments of Egypt, which signifies the sun. It is quite difficult to determine the particular monarch to whom reference is made by the use of this title; but generally the application is to the Egyptian king under whom Joseph flourished, and the line under whom the oppression of the Israelites and the exodus took place.

PHARISEES (făr'ĭ-sēs), a school or sect among the Jews, which possessed much influence during the ministry of Christ. The chief aim of this sect was to preserve the sacred religion of their fathers by resisting all Grecian and other foreign influence. Writers agree that the name was derived from perushim, a word meaning separatists, which was used to distinguish them from the priestly aristocracy known as the Sadducees. The Pharisees represented a national party of great strength in politics and religion at the time of Christ, and they are mentioned in connection with many of the events associated with Christ and recounted in the New Testament. Their fundamental principle involved the support of both law and sacred tradition, holding that Moses on Sinai came in possession of both written and unwritten law, which he passed to the elders and prophets through Joshua.

The unwritten law of the Jews included the traditions that operated to explain the written law, and in addition to the traditions received from Moses there were others established by the prophets, by wise men, and by decisions of the Great Synagogue. The Pharisees believed that the dead would be resurrected and enjoy future immortality, while the Sadducees thought that the Scriptures do not warrant such a conclusion, and they rejected many of the traditions held by the Pharisees. The scribes were teachers and doctors of the laws that arose from the Pharisees. They were classed as the most learned of the Israelites, and to them were intrusted many positions of importance by the Hebrews and by foreign rulers of later times. In the administration of the law the Pharisees were more liberal than the Sadducees, but their devotion to law and tradition led them to foster exactness in details and loose spiritual life and energy. This tended to lead to self-glorification, though the real Pharisee was one "who did the will of his Father in Heaven, because he loved him." As a class they were learned and pious, and most of the writers and commentators of their times belonged to this sect. In the teachings of Christ they are represented as proud, intolerant, and hypocritical.

PHARMACY (făr'mȧ-sў), the branch of medicine that treats of the preparing, compounding, and preserving of drugs and other substances for medical purposes. The substances used by a pharmacist include various preparations derived from the animal, vegetable, and mineral kingdoms; hence it is necessary that one engaged in pharmacy should possess a knowledge of zoölogy, botany, and mineralogy, and that he be skilled in determining the chemical constituents of drugs. In most of the European countries the general government exercises authority in regulating and supervising the pharmaceutical practice, but in the United States such authority is vested in the several states. Pharmacy has been elevated to a high standard in many of the states, and as a whole it is more efficient in this country than in the states of Europe. Many accredited schools and colleges of pharmacy flourish in the different states, at which students receive training in chemistry, botany, materia medica, and allied branches of study. It is required in some states that applicants for admission to practice pharmacy must be graduates from an acknowledged school, while in others a critical examination under a county or state board of pharmacy is necessary before being admitted to practice.

PHEASANT (fĕz'*a*nt), a genus of birds found originally in Asia, but brought to

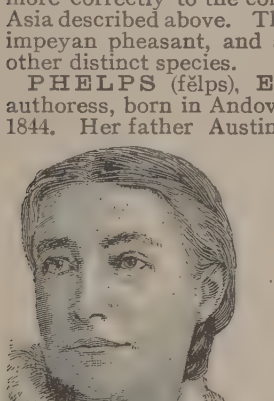


PHEASANT.

Europe at an early date in history. They were introduced into the United States from Europe. The pheasants include a number of species, and with them are usually associated numerous allied birds, all of which are highly prized as game birds. In all species the bill is short and curved, the skin surrounding the eyes is destitute of feathers, and the male has a spur on the tarsus. The

males of the species known as common pheasant have beautiful plumage, and attain a length of three feet from the tip of the bill to the end of the tail, fully half of this comprising the tail. In the female the plumage is less beautiful and the tail is much shorter. Most males have plumage variously colored, ranging from greenish-purple and brown to golden-red with shades of black, while the females have yellowish-brown plumage. Pheasants may be domesticated, in which state they breed freely, and they inter-breed with the common fowl, guinea fowl, grouse, and other birds of this class. In a wild state they roost largely on the low branches of trees or in the undergrowth, and feed on seeds, insects, worms, berries, and tender parts of plants. The name is sometimes applied to the ruffed grouse found in the southern United States; the partridge of the northern United States; the lyre-bird of Australia, and other birds, but it applies more correctly to the common pheasants of Asia described above. The golden pheasant, impeyan pheasant, and argus pheasant are other distinct species.

PHELPS (fĕlps), **Elizabeth Stuart,** authoress, born in Andover, Mass., Aug. 13, 1844. Her father Austin Phelps (1820-1890), and her mother, Elizabeth Stuart Phelps (1815-1852), were writers of considerable repute, and produced many excellent and popular works. The daughter was educated at Andover, but also received much instruction in literature from her father. She began writing by contributing to several periodicals, and in 1864 published her first book, "Ellen's Idol." From this time she was a studious and prolific writer, giving to literature many fine works in an animated, earnest, and fluent style. In 1876 she delivered a course of lectures on reformatory themes to the students of Boston University. She married Rev. Herbert B. Ward, son of William Hayes Ward of the "New York Independent," in 1888. Among her many excellent productions are "Gates Ajar;" "Story of Avis;" "Old Maid's Paradise;" "Beyond the Gates;" "Struggles for Immortality;" "Songs of the Silent World;" "The Silent Partner;" "Doctor Zay," and "Hedged In." "Gates Ajar" is one of the best known of her productions, and has passed through a large number of translations.



ELIZABETH STUART PHELPS.

PHELPS, William Walter, statesman, born in New York City, Aug. 24, 1839; died in Englewood, New Jersey, June 16, 1894. He graduated from Yale University in 1860, and after graduating from Columbia Law School in 1863, he began a successful practice at Englewood, New Jersey. In 1872 he became a fellow of Yale University, was elected to congress from New Jersey in the same year, and at once attained a reputation as a speaker. President Garfield appointed him minister to Austria in 1881, but when the administration changed, in 1882, he resigned and was again elected to congress. President Harrison appointed him minister to Germany, in which position he served from 1889 till 1893. He was a regent of the Smithsonian Institution for a number of years.

PHI BETA KAPPA, a Greek letter society having chapters in fifty American colleges. It is named from the letters of its motto, "Philosophia Biou Kubernetes," meaning in English, "Philosophy is the guide of life." The society was organized by undergraduates of William and Mary College, at Williamsburg, Virginia. At present the membership is 12,500. The chapters are governed by the national council of eleven senators and delegates from the various chapters. Meetings are held triennially, in the years 1901, 1904, etc.

PHIDIAS (fĭd'ĭ-ăs), distinguished Grecian sculptor, born at Athens about 500 B. C.; died about 432 B. C. His early training was under the direction of his father, Charmides, of Athens, and by reason of living at a time when Pericles had resolved to beautify Athens with excellent public buildings and temples and to fill them with fine works of art, favorable opportunities to produce masterpieces were at once opened to him. Pericles entrusted work of great value to him, and allowed him much latitude in planning and superintending improvements and adornments in the city. Among his work was the most celebrated statue of the Olympian Zeus (Jupiter), which was nearly sixty feet high, and stood in the temple of Zeus at Olympia. It was of ivory and gold, and was such a masterpiece of art that it was reckoned among the seven wonders of the world. This statue represented the god seated on a throne, holding in his right hand a life-sized image of the Goddess of Liberty, and in his left a royal scepter surmounted by an eagle. It is said that the great sculptor had concentrated all the marvelous powers of his genius on this sublime conception, and earnestly entreated Zeus to give him a decided assurance that his labors were approved, in response to which a flash of lightning is said to have come through the open roof of the temple. Other masterpieces were three statues of Athene. One of these in bronze represented the goddess in the attitude of battle; another in the Parthenon, made of ivory and gold, represented the goddess as an image of victory; and the third in bronze was constructed to personify the beautiful. Many of the excellent works of art that made Athens famous during the age of Pericles were either exe-

cuted by Phidias or outlined by him. The statue of Zeus was removed by Emperor Theodosius I. to Constantinople, where it was destroyed by fire in 475 A. D.

PHILADELPHIA, an important city of the United States, which ranks third in population, being exceeded only by New York and Chicago. It is situated in Philadelphia county, Pennsylvania, on the Delaware River, 135 miles northeast of Washington. The city is pleasantly located on the west bank of the Delaware, immediately above where it is joined by the Schuylkill. Its extent from north to south is about twenty-two miles, its width from five to ten miles, and its general elevation above sea-level varies from twenty-four feet to 440 feet. A number of excellent bridges cross both rivers, connecting the different parts and the suburbs for easy access. It is the focus of many important railroads, and has extensive electric car lines. Its harbor is well protected and improved. The city is important from its vast commercial, manufacturing, and educational interests. Its provisions in the way of sanitary improvements and municipal conveniences are adequate, including a fine system of waterworks, sewerage, pavements, and fire protection. The streets are substantially paved with stone, asphalt, or brick. They are regularly and beautifully platted, and numerous parks are maintained.

Philadelphia ranked as the most important manufacturing city of the United States for many years, but since 1890 the value of the annual products has been exceeded by New York. At present it has about 20,000 manufacturing establishments, representing a capital of $385,500,000, and the annual products are valued at $725,250,000. Among the principal manufactures are sugar and molasses, machinery, ironware, cotton and woolen goods, carpets and rugs, hosiery and knit goods, leather, boots and shoes, tobacco products, spirituous liquors, chemicals, paint, silk, petroleum oils, paper-hangings, furniture, confectionery, and lumber products. The city has vast printing and publishing establishments, which have an annual output valued at fully $40,500,000. Extensive navy-yards are situated in the south part of the city, where the construction of steamships and other sailing vessels has assumed much importance. These shipyards were founded in 1830, and since then about 350 ships of large size have been built there. Among the well known ships constructed in these yards are the United States cruisers New York, Newark, and Philadelphia, the battleship Indiana, and the steamships St. Paul and St. Louis. The manufacturing and commercial enterprises are not only facilitated by railway lines, but by navigation facilities on the Delaware River, which furnishes an important water highway to the ocean. Vast improvements have been made by the federal government to facilitate navigation by large vessels, and the harbor has not only been enlarged, but deepened and improved by extensive wharves. Philadelphia also has steamboat communication with Chesapeake Bay by

PHILADELPHIA: CITY HALL.

the Delaware Ship Canal, and a ship canal is projected across New Jersey to Newark Bay. The city water supply is taken from the Schuylkill River.

The city is remarkable for its many excellent business blocks, fine residences, and beautiful public buildings. It has thoroughly organized elementary and high schools, which include higher institutions for the normal training of teachers and schools for the manual training of boys in industrial arts. Among the institutions of higher learning are Girard College, the University of Pennsylvania, the Pennsylvania Institution for the Instruction of the Deaf and Dumb, Drexel Institute, La Salle College, Pennsylvania Museum and School of Industrial Arts, Jefferson Medical College, and many other colleges, academies, and institutes. The city is particularly rich in its public libraries. Its free library, organized in 1891 for the circulation of books, has about 75,000 volumes. On the corner of Locust and Juniper streets is the Philadelphia Library, containing 190,000 volumes, which have been accumulated in about 175 years. Besides these are many fine institutional libraries in connection with the various professional and general schools. The city has splendid facilities for general learning, such as educational, religious, and scientific societies, all of the important associations of this class being adequately represented by thriving organizations. On the south side of Chestnut street, between Fifth and Sixth streets, is the Old State House or Independence Hall, commenced in 1731 and completed in 1735. This building was the scene of many of the noted civil events of the Revolutionary War. The three other colonial buildings of importance still standing are the Pennsylvania Hospital, the Christ Epis-

copal Church, and Carpenter's Hall, all of which are of red brick with black glazed headers. The newer churches are numerous and represent both beauty and value. Among the substantial adornments of the city are many fine monuments and parks, the latter including Fairmount Park, which contains nearly 3,000 acres.

The first settlements on the site of Philadelphia were made by Swedes, but William Penn founded the city in 1682, and it became the capital of Pennsylvania the next year. In colonial times it ranked as the most noted center of civil interests for the colonists, and there assembled the continental congress of 1774, so famous in history. On July 4, 1776, the Declaration of Independence was adopted in Philadelphia; on July 9, 1778, the articles of confederation were signed; and in 1787 the constitution of the United States was prepared. Philadelphia was the capital of the Federal Union from 1790 to 1800, and the capital of Pennsylvania from 1683 till 1800. The first American bank was established there in 1781, and the first United States mint in 1792. The Centennial celebration of the independence of the colonies was held in Philadelphia in 1876, and in 1882 the bi-centennial of the landing of William Penn was observed. In 1683 Philadelphia had about eighty houses and a population of 500. The census returns made since the adoption of the constitution give the population as shown in the following table:

YEARS.	POPULATION.	YEARS.	POPULATION.
1790.	28,522	1850.....	121,376
1800.....	41,220	1860.....	565,529
1810.....	53,722	1870.	674,022
1820.....	63,802	1880.....	847,170
1830.....	80,458	1890.	1,046,964
1840.....	93,665	1900.....	1,293,697

PHILAE (fī'lē), an island of the Nile, located near the boundary between Nubia and Egypt, between the first cataract and Assouan, and about five miles south of the latter. By the Egyptians it is called Menlak, meaning the place of the cataract. The island is chiefly of granite formation, and is noted for its ancient architecture, dating from about 377 B. C. It has several celebrated structures, but the principal temple, built by Ptolemy II., is the most noteworthy. It was dedicated to the goddess Isis, and contains representations of the story of Osiris, including her birth, achievements, and death. This structure was 435 feet long and 135 feet broad, and still constitutes one of the best preserved ruins of Egypt. Besides it there are several temples founded by different sovereigns of the Ptolemy line and by the Cæsars.

PHILIP (fil'ep), **King**, an Indian chief of the Wampanoags, younger son of Massasoit. He succeeded his brother, Alexander, as chief in 1662. At first he was friendly to the whites, but the encroachments of the colonists led him to resist the pressure tending to cause a decline of the Indian race. In 1675 he began the long contest called King Philip's War, in which he was joined by many of the New England tribes. In this war 600 colonists lost their lives and thirteen towns were completely destroyed. His tribe was almost annihilated. He was killed by an Indian when attacked by Capt. Benjamin Church near Mount Hope, Rhode Island, on Aug. 12, 1676.

PHILIP, the name of five kings of Macedon, of whom Philip II. (q. v.) is the most important. Philip III. succeeded Alexander the Great in 323 B. C., having been elected as king by the army, and in 317 was defeated and put to death by Olympias. Philip IV. was a son of Cassander, and reigned only a few months in 296. Philip V. was the son of Demetrius II. He was born in 237 and succeeded to the throne in 220. He was the last but one of the Macedonian kings.

PHILIP II., king of Macedon, father of Alexander the Great, born in 382 B. C.; assassinated in 336 B. C. He was the son of Amyntas II., succeeded his brother, Perdiccas III., in 360, and by able and fearless diplomacy established himself securely upon the throne. His first work was to reorganize and discipline his army, and by skillful control of military and civil interests he soon made Macedon the most powerful state of the Grecian kingdom. Demosthenes endeavored to arouse all of Athens for the purpose of fortifying it against his growing power, and his celebrated speeches became known as the "Philippics." While the Athenians were slow to be aroused to a sense of their danger, Philip was rapidly gaining strength by capturing the stronghold of Chalcidice. He concluded a peace with the Thracians, and made himself master of the cities of Phocia and the Pass of Thermopylæ. Soon after he intervened between the warring forces of Phocia and Thebes, and in 340 B. C. became commander-in-chief of several Grecian states. When Athens and Thebes formed an alliance against him, he defeated their forces in a decisive battle at Chæronea in 338 B. C., and thus became sovereign of all the Grecian states. He immediately began to plan for an invasion of Persia with the purpose of avenging the injuries done to Greece. Deputies were summoned from all the Hellenic states to plan an expedition with that end in view, and Philip was elected commander-in-chief. His assassination occurred shortly after at the marriage of his daughter with Alexander of Epirus. Philip was a man of eloquence and force of character. He patronized learning, founded schools, and built highways and canals.

PHILIP I., king of France, son of Henry I., born in 1052; died July 29, 1108. In 1059 he became associated in the government with his father, but succeeded him in 1060 under the regency of his mother, and afterward reigned under that of Baldwin V., count of Flanders. In his reign the Normans con-

quered England, in the year 1066. His son, Louis, became joint-king in 1100, and succeeded him at his death as Louis VI.

PHILIP II., Augustus, king of France, son of Louis VII., born in August, 1165; died in Nantes, July 14, 1223. In 1179 he became joint-king with his father, and the following year succeeded to full sovereignty. He wedded the daughter of the count of Hainault, a descendant of the Carlovingians, and thus strengthened his position on the throne. The Jews were banished from his kingdom in the early part of his reign, and their property was confiscated. In 1189 he formed an alliance with Richard the Lion-hearted, of England, by whose influence the third Crusade to the Holy Land was organized. Soon after returning from Palestine, in 1193, he invaded Normandy, Richard being at that time a prisoner in Germany, and after his release a war raged between England and France until 1199, when it was terminated through the kindly office of Pope Innocent III. After the death of Richard, King John and Prince Arthur were rival claimants for the English possessions in France, and Philip supported the claims of the latter. When Arthur was assassinated, Philip annexed Anjou, Normandy, Touraine, and Maine to France, and his claim was firmly established by winning a victory over the Germans under Emperor Otho and the English at Bouvines on Aug. 29, 1214. He is counted the most celebrated ruler of the Capet dynasty. The later part of his life was devoted to civil and industrial reforms, and the building of fortifications, canals, and schools. He strengthened the walls of Paris, paved its streets, and fortified the principal towns of France.

PHILIP III., king of France, born in 1245; died at Perpignan, Oct. 5, 1285. He was the son of Louis IX., whom he succeeded in 1270, while conducting a siege at Tunis. Soon after he signed a truce of ten years and returned to France, where he suppressed the revolt of Roger in 1272. His death occurred in the midst of a war with Peter of Aragon, who had invaded Sicily and massacred a large number of French.

PHILIP IV., surnamed The Fair, king of France, born at Fontainebleau in 1268; died there Nov. 29, 1314. He was the son of Philip III., married Joanna, queen of Navarre, in 1284, and the following year succeeded his father as king of France. By his marriage Navarre, Brie, and Champagne were added to the royal domain, and early in his reign he curtailed the vassals in their influence. He was successful in a long war with Flanders, which resulted in annexing the Walloon territory, and in adding Guienne, formerly possessed by the English. His reign became famous for his opposition to the freedom of the clergy from taxes, which brought on an extended contest with Pope Boniface VIII. Philip imprisoned the papal legate in 1300, publicly burned a bull issued by the pope, and caused the prelates who sided with Boniface to have their property confiscated. When Boniface excommunicated him, he sent William de Nogaret with a military force to Rome, where the pope was imprisoned for a short time. Soon after the death of the latter, Philip exercised his influence in electing Clement V. to the papal throne under the condition that Avignon should be the papal residence and the Knights Templar should be abandoned. In 1306-14 many hundreds of Templars were martyred and their property was confiscated. Philip as a sovereign exercised much energy in establishing royal power by suppressing feudalism, and promoted extensive civil, industrial, and military reforms. His system of government caused a great rise in taxation, for which reason he resorted to confiscating the property of Jews, Templars, and political opponents, and at one period in his reign the currency became greatly debased. Many ordinances for the administration of the government were left by him, and he was the first sovereign to convene and consult the states-general.

PHILIP V., surnamed The Tall, king of France, born in 1293; died in January, 1322. He was the elder brother of Louis X., whom he succeeded in 1317. His reign was characterized by few noteworthy events.

PHILIP VI., of Valois, king of France, born in 1293; died near Chartres Aug. 22, 1350. He was the younger brother of Philip IV. and succeeded Charles IV. in 1328, but his right to the throne was denied by Edward III. of England, grandson of Philip IV. Edward III. claimed the throne of France by his mother, who was the sister of Charles IV. Philip was supported by the people of France and the beginning of his reign was full of promise, but Edward III. declared war against him in 1337. This war was the beginning of a contest that waged for a period of one hundred years, and was finally terminated by the French victories under Joan of Arc. The first important event of the war was the destruction of the French fleet off Sluys in 1340. Normandy was captured in 1346 by Edward, who later marched upon Paris, but after the French defeat at Crecy a truce was concluded. Soon after France became embarrassed financially as a result of royal extravagances, and the people succeeded in their demands to vest the exclusive power to tax in the assembly of the states. Philip was regarded unfriendly to learning irrational in dealing with the Jews, and exorbitant in his exactions of revenue. He was succeeded by his son, John the Good.

PHILIP, the name of five kings of Spain; the two most important are treated in articles below. Philip I., king of Castile and Aragon, the son of Emperor Maximilian I., was born at Burges on July 22, 1478; died there Sept. 25, 1506. Philip III., king of

Spain, son of Philip II., was born at Madrid on April 14, 1578; succeeded his father on Sept. 13, 1598; and died at Madrid on March 31, 1621. Philip IV., king of Spain, son of Philip III., was born at Valladolid, April 8, 1605; succeeded to the throne on March 31, 1621; and died on Sept. 17, 1665.

PHILIP II., king of Spain, son of Emperor Charles V. and Isabella of Portugal, born at Valladolid May 21, 1527; died in Madrid, Sept. 13, 1598. His mother died when he was twelve years old, but he was carefully educated for political duties under the direction of his father. He married Mary of Portugal in 1543, who died two years later, leaving a son, Don Carlos. He was summoned to Brussels by his father in 1548, that he might become acquainted with the people and institutions over which he was to become ruler, and in 1554 married Queen Mary of England. The same year his father waived his claim to Naples and Sicily in favor of Philip, and in 1555 gave him sovereignty of the Netherlands.

PHILIP II.

In 1556 the crown of Spain passed to him, and with it the colonial possessions of America, Asia, and Africa. Queen Mary died in 1558, and it was Philip's purpose to marry Elizabeth, who had succeeded to the throne of England, but, while that lady did not reject the proposal at once, she adopted a policy in religion that would have made such a union impossible. Changing his plans, Philip married Isabella of France in 1559, and soon after settled permanently in Spain. His religious policy was rigorous, and it was his design to become recognized as the head of the Catholic party in Europe, for which purpose he suppressed the free institutions that had long prospered in many parts of his vast dominion. The Netherlands revolted in 1566, and after a successful conflict established the Dutch Republic by uniting seven of the northern provinces. This contest was carried on under the leadership of William the Silent for many years, but Philip instigated the assassination of William in 1584. He was married a fourth time in 1570 to the Archduchess Anne of Austria.

The military forces of Philip II. conquered Portugal in 1580, when he annexed that country to his dominion, and immediately began to build the Invincible Armada to further his plans in successfully overcoming the naval forces of England. The war began in 1596, but the Netherlands remained hostile, while the Turks engaged a portion of his forces. The only naval victory gained in the war was that of Lepanto, which was won over the Turks by Don John of Austria. His Armada was scattered by storms, and at last was totally defeated by the allied forces of England and the Netherlands. These disasters caused Spain to lose its proud position as a first-class naval power, while financial distresses accumulated, and foreign colonies asserted their independence. Peace with France was finally concluded at Vervins in 1598. Hostilities with England and the Netherlands continued, and he died before the war terminated. Philip possessed considerable ability. He was the originator of many vast enterprises, and was popular with the zealous, but his plans were seldom successful. It was his fixed policy to persecute vigorously his opponents and those differing from him religiously by employing the Inquisition. Historians generally unite in rating him as austere, cold, and bigoted. He was succeeded by his son, Philip III.

PHILIP V., king of Spain, first of the Bourbon kings, born in Versailles, France, Dec. 19, 1683; died in Madrid, July 9, 1746. He was the dauphin Louis, son of Louis XIV. of France, and in 1700 became king of Spain, succeeding to the throne by the will of Charles II., who died without direct heirs. In 1702 he married Mary Louisa, and in the same year the Spanish Succession War was begun. It was caused by his rival claimant to the throne, Archduke Charles of Austria, who was supported by the allied forces of Austria, Holland, and England, while Spain, a portion of the Netherlands, and Naples sided with Philip. This war was finally terminated in 1713 by the peace of Utrecht, by whose terms Minorca and Gibraltar were ceded to England; Naples, Milan, and the Netherlands to Austria, and Sicily to Savoy; but the other Spanish possessions recognized him as king. His queen having died, he married Elizabeth Farnese, niece of the duke of Parma, in 1714, who began immediately to exercise much influence in the government. It was her desire to expel the Hapsburgs from Italy, that her sons of a former marriage might secure possession, a wish which for many years disturbed the peace of Europe. In 1727 an alliance was formed by Spain, Holland, France, and England against Austria, whose emperor was then in possession of most of Italy, and in 1731 Spain recovered some of its Italian possessions. In 1736 the two sons of the Spanish queen secured the throne of the two Sicilies, but these advantages were lost soon after. Philip reigned forty-six years. Many useful reforms were made in the period, including the establishment of schools, the improvement of the navy, and the founding of libraries. He was succeeded by his son, Ferdinand VI.

PHILIP THE BOLD, duke of Burgundy, son of John the Good, born Jan. 15, 1342; died April 27, 1404. He was the last of the

ducal house of Burgundy. After securing a military training, he displayed heroic courage at the battle of Poitiers, in 1356, where he rescued the life of his father and earned the title of The Bold. Both he and his father were taken prisoners to England, but in 1360 he returned to France, where he was rewarded for distinguished services by an assignment of the duchy of Touraine, to which the duchy of Burgundy was added in 1363. He lost Touraine at the time Charles V. became king of France, but later obtained Flanders by marrying the heiress, Margaret. In 1372 the French army was placed under his command, with which he secured many of the English possessions, and when his nephew, Charles VI. of France, became insane, he was made regent. Philip not only displayed military genius, but he encouraged commerce, manufactures, and arts. A number of excellent schools were established and fostered under his direction. His regency of France was alike wise and successful.

PHILIP THE GOOD, duke of Burgundy, son of John the Fearless, grandson of Philip the Bold, born at Dijon, June 13, 1396; died at Bruges, July 15, 1467. His father was assassinated through the instigation of the dauphin, afterward Charles VII., at the bridge of Montereau, and he succeeded him as duke of Burgundy in 1419. It was his desire to avenge the death of his father, and accordingly he placed himself in an offensive and defensive alliance with Henry V. of England. This king recognized him as heir to the throne after the death of Charles VI. Later he was recognized as heir by the king of France and the states-general in the treaty of Noyes, concluded in 1520, though this agreement was not in accord with the Salic law. However, the dauphin refused to recognize the treaty, and accordingly gathered a military force to assert his claims. He was defeated at Crevant in 1423, and again at Verneuil in 1424, but a dispute between Philip and the English led the former to conclude a treaty with the French king in 1429. Afterward a dispute arose between Philip and the English, when he was aided by the king of France in expelling the English from their possessions in France. Philip now became devoted to the encouragement of industrial and educational arts, for which purpose he devised a system of general taxation, and his reign was one of the most efficient and prosperous in Europe. Heavy taxation caused an insurrection in Ghent and Bruges in 1454, but it was suppressed by Philip with much ability. Burgundy was the most wealthy state of Europe during his reign, and his subjects generally mourned his death.

PHILIPPICS (fĭ-lĭp'pĭks), a name originally applied to a series of celebrated orations spoken by the Greek orator, Demosthenes, against Philip, king of Macedon, father of Alexander the Great. The number of orations is usually given as three. Their special purport was to arouse the Athenians for defensive organization against the growing power of Macedon. The name was afterward applied to fourteen orations delivered by Cicero against the dangerous and malicious designs of Mark Antony, and since it has come to signify any severe written or oral invective.

PHILIPPINES (fĭl'ĭp-ĭnz), a group of islands in the Malay Archipelago, situated southeast of Asia, and including between 1,200 and 1,800 islands and islets. The total area is about 140,000 square miles, and the population is estimated at 8,000,000. Many of the islands are small and comparatively worthless, but as a whole the group possesses remarkable richness in natural resources, and occupies a position of value in trade. The principal islands are named in the table given below, but the population as stated in the column to the right includes that of several adjacent islands. However, these figures are partly estimates, and are based upon the reports published by the government in 1901:

ISLANDS.	AREA.	POPULATION.
Luzon	46,400	3,432,424
Mindanao	34,250	217,903
Palawan	7,575	30,000
Samar	5,800	185,386
Panay	5,700	756,786
Mindoro	5,600	115,750
Leyte	4,800	270,491
Negros	3,790	240,000
Cebu	4,270	575,630
Masbate	1,400	21,500
Bohol	1,300	260,000
Romblon	600	35,000

Twenty-one other islands are of fair size, ranging from 100 to 250 square miles. The climate is diversified in the different islands, owing partly to difference in altitude and area, and partly to a difference in the effect of prevailing winds. There are three well marked seasons, including the temperate and wet from June to October, the temperate and dry from November to February, and the hot and dry from March to May. The rainfall in July and August is constant and very heavy, and in some localities it reaches annually about 114 inches. The temperature ranges from 61° to 97° during the year, though in July and August it generally remains almost stationary between 79° and 85°. The islands are of volcanic origin. There are ranges of mountains in all the larger islands, thus making a large part of the area uninhabitable, and in the more fertile parts there is a great density of population. Magnificent and luxuriant vegetation is found on the mountains and in all parts having a fertile soil. Numerous lakes and rivers afford an abundance of water for irrigating the regions not extensively visited by rains. The coast lines are generally irregular, thus affording excellent harbors. Earthquakes are frequent and in many cases destructive. The climate is generally healthful to

those acclimated, and in some localities it is highly favorable to Europeans, though other parts are subject to malaria. Smallpox, leprosy, tuberculosis, and venereal and skin diseases are the most prevalent ailments, but there is a considerable percentage of affections by typhoid fever, diarrhœa, and dysentery.

The productions of the Philippines are important and very various. Tobacco is the most extensive product, and in the volume grown annually the archipelago ranks next to Cuba. Sugar, coffee, rice, cotton, chocolate, cocoanut, corn, and cacao are next among the soil products. The tropical fruits are abundant, including pineapples, bananas, oranges, lemons, palms, and many others. Hemp is the best known product of the Philippines, and the name manila is generally applied to the commodities made from it, such as twine, rope, and paper. Splendid forests abound in different sections of the archipelago, including a wide range of species. Among the most important are ebony, cedar, gum-tree, ironwood, and sapan-wood. In many localities the forests are interlaced and garlanded by many varieties of shrubs and vines common to tropical regions. Blossoms and fruit are found hanging together on the trees in the cultivated fields, and the yield of crops of this kind is in constant succession.

The islands have an abundance of mineral wealth, much of which has been known for centuries, though the developments are only of comparatively recent date. Among the principal minerals are iron, copper, coal, sulphur, quicksilver, saltpeter, vermilion, arsenic, gold, and limestone. Petroleum and natural gas occur in considerable quantities. There are many varieties of birds of song and plumage, and various smaller animals, including monkeys, wild-cats, reptiles, huge spiders, and tarantulas. Insect life is very abundant in all the islands. The principal domestic animals include cattle, goats, and sheep, which were introduced from Spain several centuries ago. There is also a plentiful production of swine, chickens, buffaloes, and small horses. The export and import trade with Eurasian countries is considerable, but commercial business with the United States is increasing steadily.

The Philippines were discovered in 1521 by Magellan, who visited different parts of Mindanao, and in the same year lost his life in a war with the king of Cebu. Spain annexed the islands in 1569. They were named in honor of the prince of Asturias, later Philip II. The first settlements were made on Cebu, but Manila was founded in 1581, and since then has continued to be the capital. The archipelago was under Spanish dominion until 1898, when it came under the government of the United States by the peace treaty of Paris, which ended the Spanish-American War, and by its terms Spain received $20,000,000. For more than 400 years the Spanish carried on missionary work and developed a policy to build institutions and encourage trade and manufactures. Many wars for political independence were waged during this long period, and at the time of the cession Spanish supremacy had been extinguished in all parts except a small portion of Luzon, in the vicinity of Manila, where the Spanish forces had their principal seat. The insurrectionary forces continued hostilities against the United States after Spain evacuated, with the view of securing political independence, but their opposition was crushed after several years. In 1901 William H. Taft was appointed the first governor by President McKinley.

About thirty distinct dialects are spoken on the different islands of the archipelago. The seven principal ones range in the following order: Visaya, Tagalo, Cebuano, Ilocano, Vical, Pangasinan, and Pampango. Roman Catholic is the predominating religion, which was introduced there by the Spaniards, but Protestant missions have been doing effective work and are securing a large following. The inhabitants include several hundred thousand Mohammedans, who are found most largely in the Sulu Islands. Other classes include a large number of Chinese, Japanese, and descendants of Spaniards and natives. Many of the natives are advanced educationally, and include prosperous doctors, lawyers, teachers, priests, merchants, and agriculturists. More than 5,000 different books have been published in the native languages. In many of the islands the natives have developed skill in manufacture, painting, and various works of art. The school system was organized originally under Catholic missionaries, but at present many free public schools, several colleges, and a number of universities are maintained. The University of the Philippines had an attendance of 1,000 students as early as 1858, and at present it has 1,250 in attendance. Much of the interior transportation is by wagons drawn by buffaloes and mules, but several lines of railway are operated successfully, and there are extensive connections by telegraph and telephone. Manila is the capital and largest city. Other cities of importance include Lipa, Batangas, Banang, Laoag, Tibi, Balayan, and Iloilo.

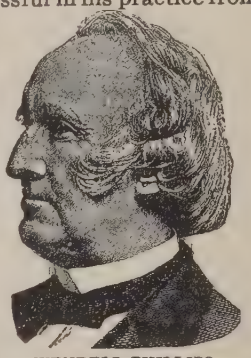
PHILIPPOPOLIS (fĭl-ĭp-ŏp'ō-lĭs), a city of Europe, in Eastern Roumelia, on the Maritza River, 235 miles northwest of Constantinople. It is the capital of Eastern Roumelia. The city has excellent railroad facilities, and is connected by several steamboat lines through the Maritza River with the Mediterranean. Among the manufactures are wine, earthenware, clothing, cigars, and machinery. A large per cent. of the inhabitants are Bulgarians, but there are many Jews, Armenians, Greeks, Turks, and Gypsies. The surrounding country is fertile, producing cereals, fruits, and vegetables. The city has a growing trade in

fruits, cereals, and various manufactures. It belonged to Turkey previous to 1878, but in that year it was occupied by the Russians, and in 1885 Eastern Roumelia became a part of Bulgaria. Since then it has been improved by the introduction of telephones and electric lights. Population, 37,260.

PHILISTINES (fĭl-ĭs'tĭns), the name of a people formerly resident in the lowlands of Palestine, on the Mediterranean coast, their possessions occupying the region from near Joppa to the Egyptian desert south of Gaza. They are mentioned in the Bible as coming in conflict with the Israelites in the age of the Judges, and are spoken of as a warlike colony at the time of the exodus. It was largely on their account that Moses selected a circuitous route in passing from Egypt to Canaan, the people fearing to encounter them in battle. Their territory consisted of five principal cities or provinces, which were governed by princes, and included Ashdod, Askelon, Ekron, Gath, and Gaza. In the time of Eli they overwhelmed the Israelites, when they captured the ark. King Saul came in conflict with them, and slew himself in the battle at Mount Gilboa. David and Solomon battled against them, and the latter finally annexed their territory, but later they were emboldened by the internal strife of Judah, when they again rebelled against Israelitic supremacy. In the reign of Ahaz they formed an alliance with the Syrians and Assyrians to harass the Israelites, but their whole country was again subjected by Hezekiah. The writings of the prophets make it certain that they were a menace to the Jews, but it is reasonable to assume that at different periods intermarriages and social connections between the two nations were of common occurrence. They appear to have been a civilized people, were devoted to agriculture and commerce, and possessed more than ordinary skill in warfare. Residing near the Mediterranean, they developed a considerable trade in manufactures. Their name is from a Semitic root meaning "to wander." The Septuagint calls them aliens. In later times their country became merged into Palestine, and all traces of their former dialect were lost.

PHILLIPS, Wendell, orator and abolitionist, born in Boston, Mass., Nov. 29, 1811; died there Feb. 2, 1884. He descended from a wealthy family, took a high school course in Boston, and in 1831 graduated from Harvard University, where he was a classmate of Charles Sumner and J. L. Motley. Both at school and college he was noted for studious habits and superior intellect, while his personal character was exemplary. After graduating at Harvard, he entered the Cambridge Law School, where he studied under Justice Story, and in 1834 was admitted to the bar. Soon after he entered the law office of Thomas Hopkinson, in Lowell, where he met Benjamin F. Butler, and in 1835 began the practice of law in Boston. In 1836 he married Ann Terry Greene, who survived him more than a year.

Phillips was successful in his practice from the first, his success being due to his extraordinary talent and fine oratorical ability. In 1837 he witnessed a mob making an assault on William Lloyd Garrison, who had spoken in Boston in favor of the emancipation of the slaves, and was so forcibly impressed that he entered upon a careful study of the slavery question. Soon after he was denounced as an abolitionist, and began to arouse public sentiment by advancing unanswerable arguments against slavery, which persuaded a large number of people to join in the movement for liberation of the slaves. His first great address on this subject was delivered at Faneuil Hall in 1837, when he denounced the murder of E. P. Lovejoy at Alton, Illinois, by sympathizers of the slave-holders. This course led many of his clients to abandon him, and his practice was almost ruined. However, he received an inheritance from the estate of his parents, by which he was enabled to devote himself to the promotion of the anti-slavery cause, and to lecture on various other subjects. His principal lecture, entitled "The Lost Arts," was delivered more than 2,000 times, and brought him fully $150,000.



WENDELL PHILLIPS.

Both Phillips and Garrison favored political equality of women, a position that led the former to withdraw from the World's Anti-Slavery Convention in London, which had refused the admission of women as delegates, and he joined O'Connell in advocating the emancipation of Catholics in Ireland. He opposed the annexation of Texas, the Mexican War, and the Compromise of 1850, and favored the separation of the free and slave states until Fort Sumter was fired upon, when he began to advocate the destruction of slavery by the defeat of the Confederacy. His hopes were fully realized when President Lincoln issued the Emancipation Proclamation, but he continued an aggressive campaign in favor of the movements that finally led to a triumph of the Union cause. After the war he became a leader of the labor party, and was one of the organizers of the greenback party. On Dec. 26, 1883, he delivered an address at the unveiling of a statue of Harriet Martineau in Boston, which was his last public oration. Phillips was remarkable as an orator in that he fired his audience to the height of enthusiasm and the most intense interest. In

speaking he was always calm and apparently unaffected, while his flow of language was easy and natural.

PHILLIPSBURG (fĭl'ĭps-bûrg), a city of New Jersey, in Warren county, on the Delaware River, fifty miles northwest of Trenton. It has convenient railroad connections and modern municipal facilities. Its manufactories produce silk, ironware, clothing, machinery, locomotives, and farming implements. The surrounding country is agricultural and dairying, and contains productive deposits of limestone and iron ore. Population, 1900, 10,052.

PHILOCTETES (fĭl-ŏk-tē'tēz), a famous archer of the Greeks, who is mentioned in their legends as the friend and armor-bearer of Hercules. The latter instructed him in archery and gave him the bow and poisoned arrows so noted in the Trojan War. Philoctetes was aggrieved by Paris' carrying Helen to Troy, since he had been a suitor for her hand, but when the Trojan War brought on the voyage of the Grecian forces he was wounded in the foot by the bite of a poisonous snake, though some thought that the wound resulted from one of his own arrows. The ulcerated wound became so disagreeable that he was left on the island of Lemnos, where he remained until the oracle declared that Troy should not be taken without his assistance. Accordingly Ulysses and Diomedes were sent to induce Philoctetes to return to the Grecian camp, where his wounds were healed by the skillful Machaon, son of Æsculapius. He soon became reconciled with Agamemnon, and in an engagement, which took place immediately after, he mortally wounded Paris. For this act he was given credit for material aid in capturing Troy. On his return from Troy he was wrecked on the coast of Italy, where he founded Crimissa and Petelia.

PHILO JUDÆUS, distinguished Jewish philosopher, born in Alexandria, Egypt, about 15 B. C. He descended from a wealthy family, and received a liberal education in his native city, where he appears to have spent his whole life. His natural ability was linked with an extraordinary desire to secure educational advancement, and he devoted constant attention to the mastery of all the studies contained in the course of the great university founded by the Greeks in his native city. His writings indicate that he possessed a wide range of knowledge in philosophy and metaphysics, and he contributed many valuable additions to history, astronomy, music, geography, mathematics, and other branches of learning. It appears that he made a visit to Rome in 40 A. D. for the purpose of persuading Emperor Caius to refrain from requiring the Jews to give up their religious views, and on this mission he was accompanied by a Jewish embassy.

Philo studied the writings of Homer, Plato, and other Grecian writers, but he continued firm in the belief that the revelations through Moses are the source of true religion, and that the philosophy of the Jews embodies the highest wisdom. Several of the fathers of the church record that he met the Apostle Peter on a second mission to Rome in the time of Emperor Claudius, though some think this is extremely doubtful. His writings indicate that he mastered the literature of his own people from translations, and that the Septuagint translation of the Bible was the only one with which he was acquainted. Writers have given us little information regarding the life of Philo, but the numerous writings from his pen that are extant enable us to become acquainted with his views of the universe and of life. By them it is possible to estimate his scientific and religious aim, and to assign him the station to which he is entitled in the history of the growth and development of thought.

He is not only the most important Hellenic Jewish writer, but we learn from his writings the views held by this particular class of Jews, and what their aim was in the teaching of secular and religious themes. A student of philosophy and Mosaic law, he gave both a high position as branches to be studied, and it was his inclination to direct his thoughts toward harmonizing the two. In his discourse on religion he points to God as the source of all good and perfection, and conceives him as being far superior to any of His creatures, His perfection assuming such magnitude that it cannot be realized. He not only holds to the view that there is a future life for the blessed, but expresses a belief in the punishment of those who do not escape the temptations of sin. There are many works assigned to him, but some are thought to be spurious. Many modern writers have searched the libraries of Eurasia and Africa for his writings and commentaries, and have added a large amount of valuable information regarding his teachings and in relation to his views on religious and scientific topics.

PHILOLOGY (fĭ-lŏl'ŏ-gy), the branch of study that treats of human language. It traces the origin, development, and general structure of the different languages, and involves all that speech discloses as to the nature and history of man. The study of language in connection with history and literature is commonly called classical philology; while the scientific investigation of the laws and principles of a language or a group of languages, as involving the comparison of different languages with each other, is usually called comparative philology. It is not the aim of the philologist to study languages so as to be able to read and speak them, but he examines them with scrutinizing care as if they had a different source, and later brings the points of likeness and dissimilarity into convenient forms, that they may be classified and grouped. Languages have a growth and life, changing to meet the

needs of men in communicating with each other.

Every discovery and invention, as well as every change in society, exercises a modifying influence upon the language of a people, and thus the languages are continually undergoing changes by certain words becoming obsolete, while newer terms spring into common use. It is possible for man to communicate without uttering sound, which is now the case with those deaf and dumb, and it is also possible that written characters may be employed to convey knowledge to others even without employing vocal sounds. The latter method was utilized in placing hieroglyphics and written symbols on monuments and other durable forms for the purpose of conveying intelligence to future generations, though it is scarcely possible that a race ever existed who employed written characters exclusively to convey ideas among the living, but instead practically all employed both vocal sounds and written characters.

It is probable that in the beginning language originated largely from sounds heard in nature. This conception of the building of a language necessarily limits the early stage to a very small sphere, and as society developed and institutions were founded it grew into more or less complexity, reaching its highest stage in the highest civilizations. As a science, philology dates from a comparatively recent time. The Greeks were the only ancient people who gave the origin of language any consideration, but their development of the science was necessarily limited, since they were acquainted with only their own language. The first advance in philological study was brought about by bringing Sanskrit to the notice of European scholars, who observed a peculiar similarity between it and Greek. Franz Bopp (1791-1867), a German scholar, was the undoubted founder of study in the Aryan languages, and he was succeeded by such eminent writers as the Grimm Brothers, Schlegel, and Wilhelm von Humboldt. It will thus be seen that the science dates practically from the early part of the last century. Since then many able writers have added a vast fund of information to the literature of the science.

Different classifications of languages are adopted by various writers, but in the main they usually agree upon three classes—the monosyllabic, the agglutinate, and the inflectional. The monosyllabic class embraces a group of languages whose words are composed of one syllable, of which the Chinese is the typical language, and to it are allied the languages spoken by the Thibetans, Siamese, Anamese, and Burmese. Agglutinate languages include those in which the word elements are so united as to retain their separate identity as modificatory syllables, and usually something of their significative power as independent words. The words are not inflected when filling different offices, and suffixes are not added, but entire words are used in combinations, as steam-boat, mankind, and lock-smith. The Turanian languages are agglutinate, and to this class belong all the languages of Eurasia not included with the Aryan, Semitic, and the cognate dialects of the Chinese.

The inflectional languages belong to two distinct families—the Semitic and the Indo-Germanic or Aryan. They are peculiar in that words are joined together and made into sentences, not by means of a set of small secondary and auxiliary words, but by means of changes made in the main words themselves. Nouns, pronouns, and adjectives are inflected by declension; verbs by conjugation, and adjectives and adverbs by comparison. Fast, faster, fastest; love, loved, loving; and man, men, are familiar examples of inflection. The Semitic and Aryan groups of languages are so different in their grammatical framework that it has been impossible for science to establish a relationship between the different groups, though it is impossible to affirm or deny that both came from a common source. The Semitic languages include the Hebrew, Arabic, Chaldee, Syriac, Aramaic, etc. Max-Müller divided the Indo-Germanic languages into the following eight classes: Indian, Iranian, Greek, Italic, Celtic, Illyric, Slavonian, and Teutonic.

PHILOPŒMEN (fĭl-ō-pē'men), eminent patriot of ancient Greece, born at Megalopolis in 252; died in 183 B. C. He descended from a prominent family of Arcadia, but lost his father at an early age, and was carefully educated under the direction of a wealthy citizen named Cleander. His first important military engagement occurred in 222 B. C., when he took an active part against the king of Sparta. In 208 B. C. he advanced to the highest dignity in the military service of Greece by being elected commander-in-chief of the Achæan League, and was reëlected to the same place seven different times. In that capacity he improved the discipline and armor of the Achæan soldiery, and defeated Machanidas of Sparta and his successor, Nabis. Subsequently he carried on a military campaign in Crete, but was recalled to organize against the rise of Roman power, which began to be an important factor in eastern Europe against the Greeks. In 183 B. C. the Messenians broke their connection with the league, and he immediately headed a body of cavalry to quell the revolt, but was taken prisoner because of a defeat by overwhelming numbers, and after being carried to Messene, he was compelled to drink a cup of poison.

PHILOSOPHY (fĭl-ŏs'ō-fy), a term which may be defined as embracing the general principles that furnish the rational explanation of anything, or as the scientific system that embraces the general principles or laws under which all the subordinate facts relating to some subject are explained. The term

is said to have been suggested by Pythagoras, who, when complimented on his wisdom, said that he was not wise, but a lover of wisdom, the Diety alone being wise. Thus philosophy means the love of wisdom, being derived from the Greek philosophia= love of wisdom. The term came into general use in the time of Socrates, who first termed any seeker after truth a philosopher, meaning a lover of wisdom. Thus the subject of philosophy included all investigations concerning both mind and matter, and it is with the Greeks that the history of philosophy has its proper beginning, since philosophic investigation of the East only served to induce study. After years of investigation, Oriental notions were systematized and incorporated with the accepted opinions of Greece. However, study was largely speculative, since the philosopher made up a theory, and then endeavored to accommodate facts to it.

The whole period of Grecian philosophy extends from the time of Thales of Miletus, about 600 years B. C., to about 500 A. D. Among the Greek philosophers are the most eminent thinkers and students of antiquity, who not only gave impetus to Greece and Rome, but carried their learning to Alexandria and promulgated theories from which modern scholars have drawn inspiration and profit. The two schools of philosophy before the time of Socrates are known as the Ionian and Eleatic. The principal representatives of the former include Thales, Anaximander, Anaximenes, and Pythagoras; and of the latter, Parmenides, Xenophanes, and Zeno. Socrates introduced a religious spirit with scientific and scrutinizing methods, and opposed the teachings of the so-called Sophists. Plato was a disciple of Socrates, but became identified with a system of idealism. Plato reasoned from the general to the particular under a system of deduction, and later Aristotle introduced inductive reasoning by proceeding from the particular to the general.

The Stoic, Epicurean, and Skeptic were the three most prominent schools of philosophy of later Greece. Rome borrowed largely from Greece, and may be said to have had no distinct schools, aside from the Eclectics, of whom Cicero is the most noted representative. Neo-Platonism was the last phase of ancient philosophy, and during the Middle Ages Scholasticism represented a form of speculative philosophy, by which it was sought to harmonize philosophy with Christianity. The Scholastics were noted particularly because of their placing especial stress upon the importance of a thorough study of Greek and other ancient languages at the expense of the newer and more practical.

The history of modern philosophy begins with the early part of the 16th century, and the two early schools are known as Empiricism and Idealism. The Empiricists have their strongest early representative in Bacon, who in 1620 published his "Novum Organum," in which he exemplified the inductive method of studying nature. It was his view that the philosopher should make the benefits to mankind a direct object, and, instead of wasting time on ingenious theories about mind and matter, he should gather facts by watching the phenomena of life, and seek to reach the general law by reasoning from effects back to their causes. This work exercised a wide influence in establishing modern methods of investigation, but the value of this method had been proven long before by Ptolemy, Archimedes, and Galileo. The Idealists were represented by Descartes, who held views opposite to Bacon's and believed that philosophical research should be based largely upon rational theories formed by mental speculations.

Later philosophers gave inquiries in connection with the mind greater consideration, and soon distinct lines of study were undertaken and the term philosophy was applied variously. Among these philosophers may be named Kant, Leibnitz, Fichte, Hegel, Schelling, Spinoza, Herbart, Richter, Darwin, Spencer, Hæckel, and many others. It is now held to be the office of philosophy to submit propositions to a critical analysis and discover why things are as they are, and thus endeavor to reach a conclusion as to the ultimate nature of the real. It must involve the theory of its possibility, since any theory of the universe having an impossibility as a central fact is at once false and absurd.

PHLOX, (flŏks) a genus of plants with opposite leaves and beautiful flowers. There are many different species, mostly herbaceous, but some are shrubby plants, most of which are perennial. The flowers appear in clusters at the upper end of a stalk, and are white, blue, purple, lilac, or crimson. Most of the varieties are natives of North America, the only exceptions being those found in various parts of Asia. The Drummond's phlox is a favorite species and is cultivated extensively. It is an annual, and blooms profusely until frost comes.

PHLOX.

PHOCION (fō'shĭ-ŏn), celebrated general of Athens, who was born about 402 B. C. He descended from humble parentage, studied under Plato and Diogenes, and attracted public attention for the first time in 376 B. C., when he aided the Athenian fleet in

securing a victory at Naxos. Later he defeated the forces of Philip of Macedon in Eubœa. In 340 B. C. he compelled Philip to raise the siege of Byzantium, and afterward to evacuate several adjacent strongholds. When Demosthenes delivered his celebrated Philippics, Phocion resisted that statesman, for the reason that he desired peace rather than war. He also advised peace at the time the Athenians advocated the war with Antipater, and later was compelled to drink hemlock for being charged with intrigues to deliver positions of trust into the hands of the enemy. However, these charges were afterward found to be groundless, and many monuments were raised to his honor. His life was written by Plutarch, who asserts that he was elected forty-five times as commander without seeking the office, and that he lived on a small farm, on which he cultivated cereals and fruits.

PHŒBUS (fē'bŭs), an epithet commonly applied by the Grecians to Apollo, which had special reference to the youthful beauty and purity of that deity. They in like manner applied the name Phœbe to Artemis, the moon-god. The Roman poets and many modern writers apply the names Phœbus and Phœbe to the sun and moon respectively.

PHŒNICIA (fē-nĭs'ĭ-à), a country of ancient times, situated on the east coast of the Mediterranean Sea. It stretched along the coast a distance of about 125 miles, beginning in the south a little below the Carmel promontory and extending north to the Island of Aradus. Its average breadth was about twenty miles. The soil of the region is generally fertile and of alluvial origin, being formed largely from the deposits of streams descending from the mountains along the eastern boundary, while adjacent to the sea are extensive sand-dunes. In the southern part a plain stretches from Acre inland, and there is also an extensive plain at Eleutherus in the north. The mountains trend to within a few miles of the coast at various intermediate points, and the narrow coast plain is noted not only for its fertility, but because of having been a favorite route for caravans from remote antiquity. There are few coast indentations, but in former times a number of excellent harbors were maintained. These are now silted up and scarcely available for large vessels of modern construction. A number of small islands lying off the northern shore were included with ancient Phœnicia. The mountains were not particularly productive in mineral wealth, though amber and several other minerals were secured, while the forests possessed timber of remarkable value. An abundance of streams flow from Lebanon to the sea, thus providing excellent drainage and an ample supply of water power. This country, now held by the Turks and populated with a general mixture of peoples, was once the home of a great historic people, who built the powerful cities of Tyre and Sidon, constructed highways and aqueducts, and exerted for centuries a powerful commercial and military influence in Asia, Europe, and Africa.

The Phœnicians have a history extending over more than 2,000 years, but it has not been definitely settled as to their original seat, nor as to the time when they formed settlements on the Mediterranean. They were Semites by race, and their language shows that it, like that of the Jews, belonged to the north Semitic group. Herodotus, the Greek historian, regarded the vicinity of the Persian Gulf to have been the original seat of the Phœnicians, while other writers think they had their prehistoric origin in the region of the Dead Sea, and that they emigrated to the coast because of earthquake disturbances. They called themselves Canaanites, and their land was known as Canaan, but this name extended also to the regions occupied by the Israelites. When the Israelites invaded Canaan, no marked change was made in the geography of Phœnicia. It had been assigned to the tribes of Asher, Dan, and Naphtali, but they conquered only a small part of it, and the relations maintained between the Israelites and Phoenicians were mostly those of friendship. Thus there was not only commercial intercourse, but evidences exist that the two peoples maintained social relations to at least some extent. This is proven by a treaty made between Hiram, king of Tyre, and David, and by the marriage of Ahab to a princess of Phœnicia.

The ancients generally thought that the Phœnicians were the inventors of navigation, though this is not at all certain. However, it is true that their ships excelled those of the Greeks in speed. They possessed vessels of excellent construction, and had officers whose skill in manning, loading, and directing the vessels was unrivaled. They were pioneers in the planting of colonies for the purpose of enlarging trade relations. For this purpose they founded successful settlements in Cyprus, Rhodes, and the islands of the Ægean Sea. Later they passed through the Strait of Gibraltar and planted colonies on the western coast of Spain and Portugal, and on the northwestern coast of Africa. Their voyagers cruised on the coasts of Hindustan and among the East Indies, which they reached from the Red Sea. In northern Africa they founded Carthage, which was their most powerful settlement. Ultimately they brought Spain into subjection, and long rivaled the imperial power of Rome. It appears that their government at the time of the exodus of the Israelites was administered exclusively by chiefs or kings, each of them being limited in the exercise of large powers in a particular city or town. Later Sidon became the seat of influence over all other states, but this distinction finally passed to Tyre.

Hiram was the last powerful king of Tyre, and was succeeded in 947 B. C. by his son, Baleastartus, who died seven years later. The reign of Hiram was the golden age of Phœnicia, when the manufactures, commerce, and educational institutions were the most brilliant, and he represents a power in Phœnicia about as splendid and prosperous as the reign of Solomon among the Israelite kings. Shalmaneser, king of Assyria, invaded Phœnicia about the middle of the 8th century, after that country had been disturbed by internal strife and invasions, but after laying an unsuccessful siege on Tyre for five years, he concluded a peace favorable to the Phœnicians. Two centuries later Phœnicia was finally conquered by the Assyrians; later it became annexed to Babylon under Nebuchadnezzar, and finally Cyrus the Great annexed it to the Medo-Persian Empire. During this time the cities retained a large part of their former independence. When Alexander the Great made his memorable invasion of Asia, the last vestige of independence passed away, and since 65 B. C. it has been a part of Syria.

The Phœnicians were not only skillful manufacturers of woolen and cotton fabrics, but they excelled in producing metal ware, jewelry, utensils, ornaments, ivory products, and earthenware. Tyre was noted as a producer of dyes from shell-fishes and wood, and Sidon developed vast enterprise in the manufacture of glass. Their mines were constructed for convenience both in workmanship and sanitary regulations, and their architecture showed great inventive skill. Fishing, agriculture, farming, and fruit growing developed into vast enterprises, and all their skill was carried to the colonial possessions. Some writers attribute to them the invention of arithmetic, measure, weight, and writing, though others think they merely introduced these arts from the Babylonians to the nations of the Mediterranean. That their language was closely allied to Hebrew is evidenced by their proper names, and also by numerous tablets relating to the sacrificial ritual, for the reason that they contain many words found in the Old Testament. The alphabet consisted of twenty-two letters, and the words were written from right to left. Their worship was a form of nature worship, or pantheism, and the sun, moon, and the five planets then known were the objects of special adoration. Baal and Astarte were their two principal deities, the former representing the male and the latter the female. Human sacrifices were offered at an early period to their god Il, who corresponded somewhat to the Moloch of the Ammonites. Only fragments of their literature and inscriptions remain.

PHŒNIX (fē'nĭks), the capital of Arizona, situated in Maricopa county, on Salt River, about fifteen miles above its junction with the Gila River. It has good railroad facilities, electric lights, waterworks, and other municipal improvements. The city is the seat of good schools and a number of excellent churches. It gives support to several educational societies and periodicals. The surrounding country is agricultural, mining, and stock-raising, thus giving the city advantages as a trade center. Population, 1900, 5,544.

PHŒNIX, a mythical bird of Egypt, represented as a species of plover with red and golden plumage, and often described as having human arms. The bird has figured in history in various connections, and has been associated with the Sothiac cycle by some writers, who suppose it to return every 500 years. Herodotus and others recount that the bird, at the age of 500 years, transformed itself into a new being by kindling a fire of aromatic gums and wood and burning up the old. The Phœnix has been used as a symbol of immortality by the Egyptians, and it appeared upon the coins of Constantine in 334 A. D. The Jewish rabbins supposed it to be alluded to in the Old Testament, particularly in Job xxxix, 18, and Psalm ciii, 5.

PHŒNIXVILLE (fē'nĭks-vĭl), a town of Chester county, Pennsylvania, on the Schuylkill River, twenty-eight miles northwest of Philadelphia. It has railroad facilities, waterworks, numerous churches, good public schools, a seminary, and a public park. It is the seat of the Phœnix Bridge Company, which employs about 2,500 men. Among the manufactures are needles, hosiery, silk, shirts, nails, hardware, pottery, and machinery. The surrounding country produces cereals and fruits. Population, 1900, 9,196.

PHONETICS (fō-nĕt'ĭks), or **Phonology**, the science of elementary sounds uttered by the human voice, showing their functions, their interchanges, and their relations one to another. Voice is modulated into speech by the lips, tongue, teeth, and palate. Animals have voice, but man alone has speech. It is possible to teach the raven and other birds to speak by rote, but man alone associates profound meaning with the word-sounds. Speech is a modification of the vibrations generated by an outward passage of air between the vocal cords of the larynx, the modification taking place as the vocalized sound passes through the cavities of the mouth and nose. The power of speech is controlled by the nerve-centers that act upon the centers of voice, and these nerve-centers are seated on the left side of the brain. Articulate speech is prevented when the nerve-centers controlling it are injured, but vocalization is not necessarily stopped, neither is the expression of thought by writing or by signs prevented.

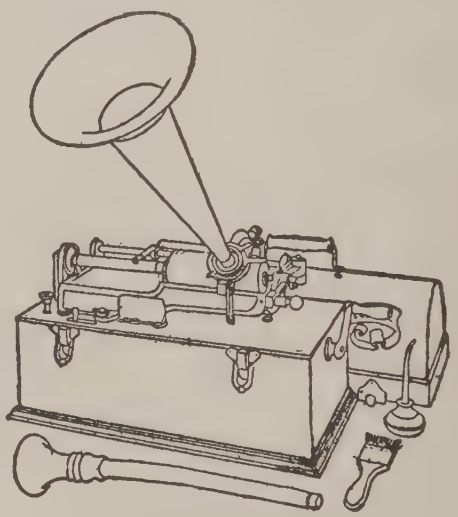
Articulate sounds are divided into vowels and consonants. The English language has twenty-six letters, but there are forty elementary sounds, this being due to the fact that a number of the letters have more than one elementary sound. Vowels or vocals

consist of pure tone only. They are generated in the larynx, and are made with the vocal organs open. A nasal quality is acquired when the back entrance to the nostrils is closed. The vowels include a, e, i, o, u, and sometimes w and y. The consonants are formed entirely in the parts above the vocal cords, the outward current of air being modified in various ways in its course through the throat and mouth. The six classes of consonants include labials, linguals, linguo-dentals, linguo-nasals, palato-nasals, and palatals. Labials, or lip-sounds, are made or modified by the lips; linguals, or tongue-sounds, by the tongue; linguo-dentals, or tongue-teeth sounds, by the tongue and teeth; linguo-nasals, or tongue-nose sounds, by the tongue, the sound passing through the nose; palato-nasals, or palate-nose sounds, by the palate, the sound passing through the nose; and palatals, or palate-sounds, by the palate.

English spelling and pronunciation are extremely difficult, owing to the large number of silent letters. The use of letters and combinations of letters as substitutes for other letter, and the combination of letters to represent sounds for which there are no single representatives also make it difficult for students to acquire easily the power to speak the language, and persons claiming to be able to spell all the words in the ordinary vocabulary are extremely few in number. These conditions have caused a number of writers to propose the substitution of a practical alphabet for English and for other languages possessing similar difficulties. These writers have suggested that the new alphabet should supersede the ones at present in use, or that radical improvement should be made, whereby it would become a less difficult task to teach and learn to read, write, and speak the language. Thus far little progress has been made in securing the adoption of such reforms in English spelling, and the only changes brought about are in isolated cases where silent letters have been omitted. The most prominent of these are such words as program, catalog, oxid, paraffin, decalog, etc., but many writers refuse to recognize even these reasonable and moderate reforms.

PHONOGRAPH (fō′nō-grȧf), an instrument for recording and reproducing the vibrations of sound. It was invented by Thomas A. Edison in 1877, and has been improved by him and other inventors until now instruments of great perfection and utility are in extensive use. The phonograph depends upon the principle of acoustics that sound from a given source spreads in a series of waves, and that its intensity at any distance depends upon the pitch and volume of the original note. This is the underlying principle of the telephone, in which the vibrations of the diaphragm are given out with such rapidity as to constitute a faithful reproduction of what was spoken into the transmitting telephone. In the phonograph a record of sound vibrations is obtained, whether of the human voice or any other agency, and these vibrations are reproduced mechanically at any future time. The instrument at first contained many defects, and may be said to have consisted of three principal parts—the sender, the recorder, and the transcriber.

The sender consisted of a tube having a metallic diaphragm at one end, at the outer surface of which was a sharp point or stylus, and at the other end of the tube was an open mouthpiece. The recorder consisted of a cylinder, usually four inches in diameter, and over it a sheet of tinfoil was placed. When words were to be recorded, the sender



EDISON'S PHONOGRAPH.

was adjusted so the point of the stylus passed lightly over the tinfoil and the cylinder was turned rapidly, the apparatus for moving it having a screw as an axis, so as to give motion that was sidewise as well as circular. A series of indentations in the tinfoil were caused by the sound vibrations in the diaphragm, and the continuous movement of the instrument had the effect that the stylus traversed the tinfoiled cylinder from end to end. Thus prepared, the next step was to call into action the third part, the transcriber. This was done by again bringing the cylinder under a stylus attached to a diaphragm, and, as the cylinder revolved, vibrations were produced similar to those created by the voice when making the record, this resulting from the stylus being affected by the inequalities in the indented tinfoil. Many of the instruments now in use are of this construction, and the more perfect still retain practically all the principal mechanical features enumerated above.

In 1889 Edison again devoted careful study to the construction and perfection of the

phonograph, and replaced the tinfoil by a wax composition. There is also an improvement in constructing the diaphragms of glass, and placing a sapphire point on the stylus. Instead of the cylinder being turned by hand, it is now moved by clockwork, and the larger instruments are rotated by an electric motor. A trumpet or funnel serves to facilitate utterance into the instrument, and the communication may be heard through tubes having tips to fit the ears. The wax composition attached to the cylinder is so constructed that it may be used several times by shaving off the record and placing another on in the usual way. There are many purposes for which phonographs are used successfully, though the principal one is where work is dictated for typewriters. Those dictating the work may be located in a quiet office, and the wax cylinders sent to another room or building, where the record may be used to reproduce the sounds in any similar instrument.

Other purposes for which a phonograph may be used include taking speeches and sermons to be heard and studied by people at a future time, or songs, essays, and orations to be heard for amusement or instruction. In many cases friends at a distance have similar instruments, and instead of writing they send cylinders containing the communications desired to be made. It is remarkable that, when transcribing at the same rate of speed as when uttering the communication, the sounds produced are quite similar to those originally made by the voice, and by the use of a funnel it is possible to make them sufficiently loud to be heard at some distance from the instrument. Cylinders containing records may be kept for a long time; hence it is possible for persons to enable their posterity to hear the exact sound of their voice.

PHONOGRAPHY (fō-nŏg'rȧ-fy). See **Shorthand**.

PHOSPHATE (fŏs'fȧt), a generic term used in chemistry to denote a salt of phosphoric acid. It is an essential element in the chemistry of plant and animal life, the various classes entering in different proportions into the tissues of both. Phosphate of soda, basic phosphate of magnesia, and phosphate of lime are the most important. Many of the poorer agricultural lands need to be fertilized by supplying phosphatic manures for the production of crops. Where such is the case, the phosphates are placed in the soil with the planted seeds. They consist principally of ground bones, phosphatic guano, bone-ash, and mineral phosphates. The United States produces more phosphate than any other country. At present the annual output is 1,650,000 tons, which has a value of $5,125,000. Florida, Tennessee, and South Carolina yield large quantities.

PHOSPHORESCENCE (fŏs-fŏr-ĕs'sens), the property possessed by some bodies that enable them to emit light without giving off sensible heat. This phenomenon is due in some cases to chemical action and in others to physical, and is induced in certain mineral substances by exposure to a strong light, to friction, to heat, or to electricity. Nearly all bodies are phosphorescent after exposure to strong light, but this form of the phenomenon is of brief duration, in many instances less than a second. Some animals and certain classes of plants become phosphorescent when decayed, especially certain species of fishes and various kinds of wood. Many species of the jelly-fishes are phosphorescent, and certain parts of the sea-pens, fireflies, glow-worms, and numerous deep-sea fishes possess this property. It is possessed by many forms of fungi, some liverworts, and algæ. In the tropical seas and some of the temperate climates phosphorescent lights appear on the surface of the water, these being attributed to microscopic animals. The hairs of a cat give off light if rubbed in the dark when warm, and also the hairs of many other animals, while friction on rocks, salt, and sugar induces this property. Certain fishes have the property of converting nervous energy into electricity when disturbed.

PHOSPHORUS (fŏs'fŏr-ŭs), one of the elements, which was discovered by Brandt, of Hamburg, in 1669. It is non-metallic, almost colorless, and forms a wax-like solid. At ordinary temperatures it may be readily scratched by the finger-nail, and its density compared with water is 1.83. It melts at 180°, boils at 550°, and, owing to a slow oxidation, is luminous in the dark. Water will not dissolve it, but it is soluble in most oils. Being highly inflammable, it must be handled with much care when exposed to air, and for safety against spontaneous combustion it is necessary to keep it under water. It is set on fire in the open air by the friction resulting from pressure between the fingers, and by the hand when rather highly warmed. Phosphorus has an energetic affinity for oxygen, and, when united with it in burning, the flame becomes more vivid. It is very poisonous, and, when poisoning by it is not quickly followed by death, usually fatal forms of diseases of the heart, liver, kidneys, and tongue are produced.

Phosphorus is found in a state of combination in the soil, in unstratified rocks, and in many parts of plant and animal bodies. The larger part of this element sold in the trade is obtained from the bones and urine of animals. In preparing it from bones, they are first burned and treated with two-thirds of their weight of sulphuric acid diluted with water. The liquid portion is then evaporated, and, after mixing with charcoal, the remaining portions are desiccated by heating in an iron vessel. The dry mass is then placed in a stone retort, in which it is heated, and the phosphorus is conducted through a

worm into water, where it is collected for use. Phosphorus is used for making matches, in preparing vermin poisons, and largely for medicine. It unites with most of the metals and forms phosphides. Amorphous phosphorus is a reddish-brown modification of phosphorus obtained by heating common phosphorus to about 450° in air-tight vessels, and is used for safety matches.

PHOTIUS (fō'shĭ-us), eminent patriarch, who is celebrated because of his interest in advocating the separation of the Eastern and Western churches. He was born in the early part of the 9th century at Constantinople, where he secured a liberal education, and was promoted to various public offices. After serving on a diplomatic mission to Persia, he became secretary of state under Emperor Michael III., and in that capacity obtained the friendship of Cæsar and the minister, Bardas, uncle of Emperor Michael. Ignatius was at that time patriarch of Constantinople, but incurred the displeasure of the emperor and was deposed and exiled. Photius was supported for the patriarchal dignity by Bardas, and, though only a layman, was appointed to that important position. Two successive councils of bishops confirmed the election, but Pope Nicholas I. opposed him and favored reinstating Ignatius. An extended controversy resulted, in which the emperor took a position opposite to the pope, but the latter excommunicated Photius. However, he retained possession, since he was supported by the emperor, and in 867 convened a council at Constantinople, which raised questions of discipline and doctrine between the Eastern and Western churches.

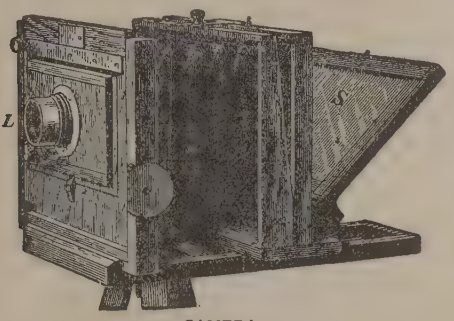
In the same year Emperor Michael was murdered by Basil, and the latter prince was raised to the throne of the Eastern Empire. He immediately restored Ignatius and banished Photius, but at the death of the former, in 878, Photius resumed the office. Shortly after a council was called at Constantinople by which the Western church was condemned on a doctrinal point, and from that time the official division of the Greek Church from the Roman Church may be said to date, though the separation was not completed till some time later. Photius was banished to a monastery in Armenia in 886, on the accession of Leo, son of Basil, and he died there in 891. He is celebrated as a man of profound learning, rare genius, and cultivated literary judgment. Among his works are "Myriobiblion," a review of ancient Greek literature; and "Nomocanon," a collection of the acts and decrees of councils prior to the seventh ecumenical council. Many translations from his works have been made, especially into Russian and German.

PHOTOGRAPHY (fō-tŏg'rȧ-fy), the process of producing pictures by the action of certain sensitive substances under the influence of light. The art had its beginning with the discovery that fused silver chloride darkens on exposure to light. This discovery was made about 1600, but there was scarcely any progress in developing the art until in 1777, when the Swedish chemist, Scheele, found by numerous experiments that the darkening originates from the violet end of the solar spectrum. In 1802 successful experiments were made by Thomas Wedgewood in taking profiles upon paper with nitrate of silver under the influence of the light of the sun, and shortly after he published his method. However, there was no process of rendering permanent the objects taken in that way until in 1814, when M. Nicephore Niepes, a Frenchman, discovered a method of producing pictures on plates of metal covered with a coating of asphaltum, and devised the means to secure permanency. The present art of photography was discovered by Daguerre in 1839, when he found a method of taking pictures on silver-plated copper plates. The process consisted of exposing the plate for a short time in a camera, and afterward it was developed in a dark room by exposure to mercurial vapors. While his discovery laid the foundation for photography, his methods have gone largely out of use on account of newer and more rapid processes. The so-called wet-plate process was perfected by Scott Archer in 1851, and the collodion dry-plate process by Hill Noyes in 1856.

The more recent discoveries include the preparation of collodion emulsion dry-plates; the proper care and treatment of dry-plates, and the photography of natural colors. The latter is one of the most remarkable discoveries of recent times. It is generally attributed to Mayall, who, in 1887, published some valuable information in regard to securing quite satisfactory results in photographing the natural colors of the object taken. Other improvements that may be cited include good results by the use of artificial light, the instantaneous process for photographing objects in motion, and methods of making pictures by the use of the X-ray. The instantaneous process requires exposure for only about one-three-hundredth of a second, thus enabling scientists to successfully photograph a moving train or a bolt of lightning with considerable accuracy. The X-ray method has added much of value to the medical practice, since by its application it is possible to prepare a photograph of a bullet located in the body, or a good view of any foreign substance or abnormal growth with which a patient may be affected internally.

Many different processes are utilized in photography, and it would be quite impossible to describe in detail all the kinds employed. The more general method is to prepare the photograph on a glass plate that has been sensitized before putting it into the camera. This is done by coating one side of the glass with a thin film of collodion.

The collodion is prepared in various ways, usually by a solution of gun-cotton in ether and alcohol. The glass plate is next treated in a bath containing a mixture of water and nitrate of silver. It is necessary to put the silver nitrate on in a dark room, and light must not fall upon it until it is exposed to



CAMERA.

the object to be photographed, for the reason that exposure to light darkens the film. When a photograph is to be made, the glass plate is put into a camera, an instrument in the form of a dark box, with a glass screen, *S*, in front, as is shown in the illustration. The camera is pointed toward the object of which a picture is to be made, and, when properly adjusted, its cover is removed for the purpose of allowing the lens at *L* to throw an image of the object upon the sensitized plate.

The impression is so delicate that it cannot be seen, but by washing the plate in a solution of pyro-gallic acid, or some similar chemical, the negative is developed. When the picture has been sufficiently brought out, the plate is washed in hypo-sulphite of soda and dried, and the side containing the film is varnished to prevent its being injured by rubbing. After it is carefully retouched by the artist to remove all imperfections it is ready to print the photographs. The paper used for the photograph can be secured in the market, or it may be prepared by coating thin sheets of paper with a mixture of albumen from the whites of eggs and chemicals. This prepared paper is next treated with a film of silver nitrate, when it is placed in a frame next to the negative and exposed to day or artificial light.

The negative differs from the positive in that the dark parts of it represent the light portions of the objects photographed, and the light parts the dark portions. When light is applied to the negative, there are imprints on the paper below exactly opposite, as the light and dark shades are differently affected by the light passing through them, and the paper below, being coated with nitrate of silver, receives impressions to represent exactly the object photographed. The artist is governed by the intensity of light and the character of the negative in taking the prints. When sufficiently exposed, the picture is taken from the frame, washed in a solution of soda to take out the silver nitrate not turned brown, and it is then toned by washing in a bath containing chloride of gold. It is next fixed by a varnish and pasted to a cardboard. The size of a photograph depends upon the size of the instrument and its distance from the object taken.

Astronomical photography is a comparatively new field of research. By the use of powerful telescopes it is possible to secure excellent photographs of stars and clusters of stars not visible to the naked eye. The first experiments in this now extended field were made by John W. Draper, of New York City, in 1843. The kinetograph, an instrument for taking a series of photographs of a moving object, is another of the newer inventions. These views or pictures may be thrown on a screen by a magic lantern so that the image presents the exact motions of the original. By means of photo-microscopy it is possible to photograph microscopic objects for future examination. Besides, photography has wrought many improvements in lithography; the name photo-lithography being applied to the reproduction of photographs from a lithographic stone. These improvements and others have revolutionized book and newspaper illustrating, and greatly popularized all classes of periodicals.

PHOTOGRAVURE (fō-tō-grȧv'ûr), the art of producing by photography plates for printing in a copper-plate press. The earliest attempt to prepare engraved plates by this process dates from 1827, when M. Nicephore Niepes, of Paris, found that light vigorously affects thin plates of bitumen. He soon after coated a number of metal plates with a thin film of albumen and exposed them to an image for several hours by means of a powerful camera obscura. These were next treated with oil of spike to dissolve the parts not affected by exposure to light, which, however, did not affect the other parts. A treatment with strong acids further lowered those parts, thus producing a complete etching-plate from which any number of impressions could be taken on paper. Since then many improvements have been made, and the art has been productive of results quite equal to a photograph. However, the cost of securing pictures by this process has confined its use largely to high-class book and magazine work. Many processes are employed successfully for all classes of printing. Usually a photographic film is laid on a metal plate and is exposed to the action of light under a negative. A certain per cent. of graphite is mingled with the gelatin film, which causes the surface to assume a grain corresponding exactly with the lights and the picture. When placed in an electrotype bath, the granular surface conducts currents of electricity and thus takes on a coating of copper. The copper-plate

prepared in this way may be used in a press for printing on paper, but grades with a fine surface finish are preferred.

PHOTOPHONE (fō'tō-fōn), an instrument by which sound may be transmitted along a beam of light instead of a wire, as in the telephone. Inventors have produced a number of similar instruments called radiophones, but the photophone proper has a good representative in the invention of A. G. Bell, completed in 1880. This instrument contains as an essential feature a cell made of the rare metal selenium, which, when acted upon by light, offers more or less opposition to the passage of electricity. It has a plane mirror of silvered glass or mica, from which a parallel beam of powerful light is reflected toward a parabolic reflecting mirror, in the focus of which is a selenium cell, connected with a battery and a telephone. Any sounds which cause the diaphragm to vibrate produce a corresponding variation in the reflected light, and this in turn alters the resistance of the selenium cell to the current of the battery, and at the end of the attached telephone becomes audible as vocal sound. The photophone may be used only at short distances, but articulate sounds may be transmitted by sun or any artificial light, even by an ordinary kerosene lamp.

PHRENOLOGY (frĕ-nŏl'ŏ-jў), the art of determining the mental and moral faculties of an individual and indicating their qualities by measuring the development of the brain upward, forward, and backward from the medulla oblongata, the measurement being by cranial diameters and distances from the openings of the ears. As a doctrine it teaches that the brain is the organ through which the human mind acts, and that a relation exists between the several faculties of the mind and particular portions of the brain. According to this view the brain is not strictly a single organ, but consists of a number of different organs having close interdependence, but each of them is influential in some particular line, or has some special function. It has been held from ancient times that the brain as a whole is the part of the human body through which the mind operates, and the first attempts to localize the several faculties were made by Franz Joseph Gall, who was born in Tiefenbrunn, Germany, March 9, 1757, and died Aug. 22, 1828. He gave a course of lectures on this subject at Vienna in 1796, and was soon after joined by Johann Gasper Spurzheim (1776-1832), a German physician. The two prepared a chart of the cranium, and to each small section assigned the dwelling or location of a certain propensity, sentiment, or inclination.

Later Spurzheim divided the thirty-five mental faculties enumerated by Gall into moral, or effective, and intellectual. The moral, or effective, faculties were subdivided into propensities and sentiments; the former producing desires or inclinations, while the latter along with them excite some higher emotion. The intellectual faculties were divided into perceptive and reflective, and all were localized on the skull. In 1807 Gall and Spurzheim visited Paris, where they lectured for a number of years, and succeeded in securing the appointment of a commission by the Institute to investigate the system, but this resulted in an unfavorable report, which was drawn by Cuvier, the celebrated naturalist. Soon after Spurzheim visited England, where he found an enthusiastic supporter in George Combe, who is the author of the celebrated work entitled "System of Phrenology." Many specialists have verified a number of the principal claims made by Gall and Spurzheim. Some of them are well established and have a place in scientific physiology.

Another school of phrenologists base their system on protuberances and depressions of the skull, this particular branch being sometimes called craniology. While physiology verifies to a limited extent the claims made by craniologists, their data and conclusions are both general and uncertain, for the reason that the intervening flesh, skin, and hair do not allow an accurate estimate of the protuberances and depressions, and because the hollows on the inside of the skull do not always correspond to the elevations on the outside.

PHRYGIA (frĭj'ĭ-ȧ), the name applied anciently to a large country in Asia Minor, inhabited by a class of people called Phryges by the Greeks. The boundaries varied at different periods, including at one time most of the peninsula, but comprising for the greater period of its history the west-central part. Their language was closely allied to that of the Greeks, and they bore a close kinship to the tribes of Thrace and Macedonia. Historians are uncertain as to the early history of Phrygia, but it is thought that the kingdom rose from an older civilization, this being evidenced by a few monuments still remaining. The Phryges engaged in stock raising, mining, and agriculture, giving marked attention to the cultivation of vines and fruits. Laodicea, Apamea, and Colossæ were their principal cities, in which they built excellent temples and monuments, a fact verified by extensive ruins. Phrygia was overrun by the Cimmerians in 670 B. C., when King Midas of Phrygia lost his life, and ten years later the country was made a province of Lydia. The Persians annexed it in 549 B. C.; under Alexander the Great it became a Grecian territory, and later it formed a part of the province of Asia under the Romans. The inhabitants were noted for their stubborn resistance to oppression, for advancement in civilized arts, and for the influence exercised by their religion upon the mythology of Greece. At present most of the region is included with the Turkish vilayet of Kodavendighiar.

PHYLLOXERA (fĭl-lŏx-ē′rȧ), a genus of lice classed with the aphidæ, which feed as parasites on different kinds of plants. The most noted species is an injurious pest to the vine. This form is native to North America, where it was first observed in 1854, but since it has been carried to practically

PHYLLOXERA.
1. Wingless Female.
Winged Female. Leaf covered with Galls.

all countries in which the vine is cultivated. It existed on wild vines at the time America was discovered, and with the development of grape culture it began to infest the cultivated varieties, though for many years the cause of grape destruction by this insect was not understood. The insect infests both the roots and the leaves of the vine, as shown in the accompanying figure. The forms infesting the roots are the wingless females (1), which suck the sap by means of an elongated rostrum and cause swellings of the rootlets. These wingless females multiply parthenogenetically—that is, by means of unfertilized eggs without the intervention of a male, but after a few generations winged females are produced.

The winged females feed on the leaves and buds, where they lay two sizes of eggs, from the smaller of which wingless males develop, and from the larger wingless females. After fertilization, the female lays a single egg in the fall, from which a wingless female, the stock-mother, is hatched in the spring. The stock-mother forms galls on the underside of the leaf and multiplies parthenogenetically with rapidity, some of the offspring forming new galls, while others descend to the roots. When the vine is infested by a large number of these insects, the roots become knotted and deformed, and the leaves indicate a diseased condition by turning yellowish, and later life becomes totally extinct. These insects have been distributed in commerce by transporting cuttings and vines, and were particularly destructive in France in 1865-67, in Germany in 1881, and spread in rapid succession to Austria, Switzerland, England, and the Spanish peninsula. Subsequently they appeared in Australia and various parts, of Africa, Asia, and South America. No absolute preventive or remedy is known, though some success has been attained by the use of petroleum tar and by watering the roots.

PHYSICAL GEOGRAPHY. See **Geography.**

PHYSICAL TRAINING. See **Delsarte, Gymnasium,** etc.

PHYSICK (fĭs′ĭk), **Philip Syng,** surgeon, born in Philadelphia, Penn., July 7, 1768; died there Dec. 15, 1837. In 1785 he graduated from the University of Pennsylvania, studied medicine in Philadelphia and London, and in 1791 received a license from the Royal College of Surgeons in the latter city. During the yellow fever epidemic of 1793 in Philadelphia he acquired a reputation as a successful practitioner, and the following year became surgeon of the Pennsylvania Hospital. His successful treatment of various diseases and the introduction and improvement of numerous useful instruments caused him to be called the "Father of American Surgery." Among the honors bestowed upon him are a degree by the University of Edinburgh in 1792; the presidency of the Phrenological Society of Philadelphia in 1822; and membership in the French Academy of Medicine in 1825. He was recognized by a large number of other societies and organizations.

PHYSICS (fĭz′ĭks), or **Physical Science,** the science that treats of the phenomena associated with matter in general, including an investigation of the laws governing these phenomena, and treating especially the relations of matter to energy. The two great branches into which the knowledge of nature is classed according to its subject matter are designated physical science and natural science. Physical science is properly limited to an investigation of phenomena that are observed in things without life, though it extends this investigation to living forms when the same phenomena are observed in a living being; while natural science is now limited to the study of organized beings and their development. Physics in a narrower sense is equivalent to the branches usually treated under natural philosophy, a term more commonly used until within recent years. As now understood, physics is generally held to treat of the constitution and properties of matter—fluids, mechanics, acoustics, heat, optics, and electricity and galvanism. The changes treated in physics differ from those considered in chemistry, since a physical change is one that does not affect the composition of the molecules, and so does not alter the specific properties of the substance; while a chemical change is one that implies a rearrangement of the atoms into new molecules and so destroys the specific properties of the substance. Dissolving sugar in water involves a physical change, while burning coal involves a chemical change.

PHYSIOGNOMY (fĭz-ĭ-ŏg′nō-mў), the art of reading character and the quality of mind by the features of the face. It is founded upon the belief that there is an intimate connection between facial features and

expression and the qualities and habits of the mind. This art was supported in the philosophy of Aristotle, who ascribed cunning, daring, bravery, ingenuity, and other traits quite largelyaccording to the features observable in the human face. In 1586 the first authentic work was published in France by Baptista della Porta, entitled "Human Physiognomy," in which the theories were elaborated and applied to representative cases. Sir Charles Bell published his "Essay on the Anatomy of Expression" in 1806, and may be said to be the first who gave scientific study to facial expression as related to the changes of the countenance and the muscles which produce them. Many of the representative writers who gave thought to psychical subjects in the last century, among them Spencer and Darwin, correlated physical action with psychical states. Pieter Camper (1722-89), the eminent anatomist of Holland, wrote "Discourse on the Face," and Johann Gasper Spurzheim published "Physiognomy in Connection with Phrenology." See **Phrenology**.

PHYSIOLOGY (fĭz-ĭ-ŏl′ō-jў), the science that treats of the operations taking place in living beings. It is divided into human, animal, and vegetable physiology. Histology, anatomy, hygiene, and chemistry are allied studies, since physiology as a science is dependent in a large measure upon the progress made by the student in these related branches. Histology considers the minute structures of the tissues as made known by microscopic studies; anatomy treats of the number, structure, and connection of the parts making up an individual being; hygiene is the study of the conditions most favorable for healthful action of the several parts and of the whole; and chemistry embraces the study of the nature and properties of every object accessible to man.

Human physiology treats of the processes or changes that take place in the organs and tissues of man. The human body develops from a minute cell or ovum called embryo, which consists of a mass of protoplasm containing the germinal vesicle as a nucleus. The smallest known masses of living matter assume the spherical form, and are known as the cells. These have a soft, colorless appearance, and in the living state consist of structureless material, found by microscopic examination to have slow movements. Protoplasm, consisting of a transparent material, is the life principle, and is constituted of carbo-hydrates, fats, proteids, and water. The functions of granules and nuclei found in the protoplasm are not known definitely, but the protoplasm itself has the power to grow, absorb, move, excrete, secrete, and multiply. It is most easily studied in the simplest of animal life, particularly in the amœba, a protozoan having a simple protoplasmic body with a nucleus and nucleolus, and effecting movement by the extension of parts of the body. These animal forms constitute the lowest living beings, while the human body embraces the highest form.

Each living cell is capable of receiving material different from itself as food, though this material must be in a state of fine division, and chemical and physical changes take place until it becomes a part of the cell itself. In this manner the material acquires properties and powers not before possessed by the food. While this growth of cells is much more minute, it is similar to the growth of tissues, of organs, and of the body itself. If a cell receives food-material in excess of its wants, or if it has grown to maturity, then new living cell-centers begin to form. The new cells have the same tendencies and properties possessed by the parent cells, and the rapidity with which tissues, organs, and the body receive new cell formations determines growth; in other words, growth consists of the addition of cells. Both in the living cell and in the living body there is a ceaseless internal motion and change in material. Old or used materials are removed without intermission, though this ceaseless process is not rapid; new materials are constantly taken in and changed and modified in the organism, and these finally enter into its structure. When changes in the cells or tissues discontinue, local death results; and when changes cease in the entire organism death ensues. Each individual being possesses in its organism a controlling force, usually called the germ force, or the vital force. This is transmitted from generation to generation, but is modified largely by external and internal conditions. In all the higher types of animals there are five principal tissues—blood, epithelium, connective tissue, nervous tissue, and muscular tissue.

The physiology of the different organs of the body is discussed along with the anatomy of such organs in different articles, and it is necessary in this article to call attention only in a general way to the more specific connections between them. The skeleton is constituted of the bones, which serve to protect the delicate organs of the body; to act as levers for the production of motion by the muscles, and to give general form to the body. The skeleton determines the height and breadth of the body. Its 208 separate bones are held together, so as to act with the greatest nicety, by the flexible bands called ligaments. The different bones are constructed with the view of supplying the particular wants in providing strength, rapidity of movement, and surface for the attachment of muscles, by being either solid, hollow, or enlarged at the ends. The skeleton is surrounded by the flesh, which consists of about 500 distinct fleshy masses, called muscles, and their size, form, and arrangement depend upon the outline of the skeleton. Motion is produced by the expansion and

contraction of muscles when acting upon the bones, and all are held in place by a whitish connective tissue. However, there are some muscles that are not under the control of the will, such as those of the heart, where the motion is said to be involuntary. The muscles are covered by the skin, a tough, close-fitting garment for the protection of the tender flesh. The skin is elastic, thus being adapted to respond to every motion of the body, and not only preserves its delicacy and smoothness by oiling itself, but when worn out is rapidly replaced by a new growth.

Living matter of animal bodies is constituted essentially of the six approximate substances classified as water, salts, fat, proteid, carbo-hydrate, and oxygen; their three most important constituents being nitrogen, carbon, and oxygen. About forty per cent. of the weight of the body of an adult is made up of muscles; fifteen per cent. of the skeleton; while about sixty-five per cent. of the whole is water. The blood permeates every part of the body and directly or indirectly nourishes all the tissues, while it also removes such materials as are not available for further use by carrying them to the excretory organs. The heart is the great central engine that propels the blood, sending it out through the arteries, whence it passes through the capillaries into the veins. These organs convey it to the lungs to be purified, and the red oxygenated blood is passed into the circulation. To maintain animal life it is necessary that carbonic acid be continually excreted and oxygen absorbed. These processes are effected by respiration; inspiration carrying the fresh air laden with oxygen into the lungs, where it is taken up by the blood, and expiration carrying off the impurities of the body. This necessary function of the body is also aided by the skin giving off waste matter through the sweat glands and taking in oxygen, while the kidneys filter the blood and separate from it matters foreign or useless. The glands separating fluids from the body are sac-shaped cavities. Among the principal waste products of the body secreted by glands are the sweat and urine. The fluids vital in the process of digestion include the saliva, gastric juice, pancreatic juice, bile, and intestinal juice. The human brain is the center of impulse of the elaborate nervous system, and controls and guides the voluntary and involuntary muscles. It is the central organ that directs all movements, and is the seat of the special senses —taste, touch, smell, sight, and hearing. Each of these senses has a special organ connected with the brain by a particular nerve, and the whole nervous system conveys to the mind sensations by which it obtains a knowledge of the external world and of the feelings and acts of the body.

Since the body is constantly giving off waste matter, it is necessary that fresh material be supplied in sufficient quantities. Man would starve within a few days if a constant supply of food materials was not provided since all the available flesh of the body would be consumed by the oxygen. Different kinds of food must be selected with the view of supplying the various needs of the body, and the time for supplying the food material should be adjusted at proper intervals, otherwise nutrition may not supply the living body with material at the proper time. Digestion is dependent upon the action of the mouth, teeth, tongue, pharynx, esophagus, stomach, and intestines. The food is chewed and mixed with saliva in the mouth; it is next passed through the pharynx and esophagus into the stomach, where it is acted upon by the gastric juice and subjected to the churning motion of the stomach, thus promoting the digestion of the proteids and starchy foods. The mucous coat of the stomach is provided with multitudes of glands, which secrete the gastric juice, a colorless and watery fluid with a sour taste and odor. From the stomach the food passes through the pylorus into the duodenum, where it receives the bile and pancreatic juice and is converted into chyle, a mass with a milky appearance. It next passes through the small intestine, an intricately folded tube about twenty-five feet long; is acted on by the intestinal juices, and the nutritive portions are absorbed by the lacteal glands. The movement forward in the small intestine depends upon its peristaltic action, a successive wave-like contraction extending gradually from the upper to the lower part of the canal.

The blood vessels of the alimentary canal absorb the nitrogenous foods and form the portal vein, which goes to the liver, then by means of the hepatic vein it is taken to the ascending vena cava to form a part of the circulating fluid. Nutriment is also taken by the lymphatics, which unite in the thoracic duct, and is conveyed by capillary attraction to the vein under the left collar bone; thence it empties into the left innominate vein and is carried into the circulation. The entire process of digestion requires from two to four hours, this depending on the class of food taken into the body. Digestion is a process of great complexity as compared to the processes of circulation, respiration, and other functions of the body.

PIANOFORTE (pĭ-ăn'ō-fōr-tā), the name of a stringed musical instrument commonly called piano, the sounds of which are produced by blows from hammers acted upon by levers called keys. This instrument is probably the most extensively used musical device in the world. Though of comparatively recent date, it may be said to have resulted as the perfected form of all the ancient instruments which consisted of strings struck by hammers, particularly of the harpsichord and clavichord. The original pianofortes had strings placed in a small

and portable box, on which the operator played by striking them with a hammer held in the hand. It was called dulcimer in this form, and is still used in many countries of Eurasia. The clavichord was an improvement over the dulcimer, in that the strings were plucked with quills, while the next material improvement consisted of the harpsichord, an instrument with a more extended compass and often with two or more manuals. The earliest form of the pianoforte was made in the early part of the 18th century and was in many respects inferior to the harpsichord, but it contained the elements by which it could be expanded, and from it resulted the modern grand pianoforte.

The instruments of modern structure must necessarily have a heavy frame, since a large number of strings are to be stretched, and these cannot be kept in tune unless the frame is heavily timbered or made largely of cast iron. Strings were made originally of steel wire for the upper tones and of brass wire for the lower tones, but modern instruments have strings wholly of steel wire. The strings pass over a series of bridges rising from the sounding board, and the tones depend upon their size and length. Long and large wires supply low tones, while the short and fine are used for the higher tones. Wires for the lower tones are usually made of steel with a double wrapping of fine brass or copper wires. There are two common forms of pianofortes, the grand piano and the upright piano. The strings in the grand piano lie in the direction of the keys, and in the upright piano the strings are stretched vertically perpendicular to the keys. The grand pianos of modern structure are made with six, seven, or more octaves. As a rule, the larger instruments are used in concerts, since they supply the necessary compass and strength and furnish every gradation of sound.

PIASTRE (pĭ-ăs'tĕr), a coin of various values used in a number of countries in Europe and Asia. The piastre used in Spain is about equal to our dollar. In Italy the government patterned after Spain in coining its piastre, but the value is only about eighty-nine cents, while the piastre of Turkey is a little less than five cents. The piastre used in Egypt has a value of about five cents. In a number of South American states the name is applied to money, but the value differs somewhat.

PIATT (pī'ăt), **John James**, poet, born in Milton, Indiana, March 1, 1835. He studied at Kenyon College and Capitol University, Ohio, and soon after became private secretary to George D. Prentice, editor of the "Louisville Journal." Afterward he was a clerk in the national treasury at Washington, where he remained until 1870, when he became clerk of the United States house of representatives, and the following year was made its librarian. In 1882-94 he was United States consul at Cork, Ireland. During leisure times he gave studious attention to poetical writings, in which work he was assisted by his wife, Sarah Morgan Bryan. His works include "Poems of Two Friends;" "Poems of House and Home;" "Idyls and Lyrics of the Ohio Valley," and "Lost Hunting Ground." His wife was born in Lexington, Kentucky, Aug. 11, 1836. Besides assisting him in several productions, she wrote a large number of interesting works, including "Poems in Company with Children;" "An Irish Garland;" "Little Emigrants;" "Voyage to the Fortunate Islands;" "Dramatic Persons and Moods;" "An Irish Wildflower," and "An Enchanted Castle."

PIBROCH (pē'brŏk), a form of music played on the bagpipe, which includes marches and dirges. The martial character of this music has a powerful effect in arousing military spirit, especially among some of the people of Eurasia, but the rhythm is irregular and difficult to learn, since the scale of the bagpipe contains sounds unrepresented by any notation.

PICAYUNE (pĭc-ă-ūn'), a word derived from the language of the Caribs, and applied to a small Spanish coin current in the United States until the Civil War. Its value was six and one-fourth cents, and it was called sixpence in the northern states. The word picayunish, meaning small and paltry, was derived from it.

PICCOLOMINI (pĭk-ko-lo'me-nee), **Ottavio**, duke of Amalfi, born at Siena, Italy, in 1599; died in Vienna, Austria, Aug. 10, 1656. He descended from a distinguished family, which is noted because of supplying one of the popes, Pius II., several cardinals, and a number of writers and warriors. He entered the military service of Spain, but later was sent to aid Ferdinand II. of Germany in suppressing the Bohemians in 1621, and bore an important part in the battle of Weisseberg. In 1632 he was at the battle of Lützen, and historians generally recount that his regiment fired the shot which killed Gustavus Adolphus. Subsequently he operated with Wallenstein in Bohemia, and aspired to the Bohemian throne, for which reason he was instrumental in causing the fall of that distinguished general. In 1635 he had charge of the Spanish forces in the Netherlands, commanded in Sweden in 1648, and in 1649 became a field-marshal under Emperor Ferdinand II. Soon after he was honored by the king of Spain, who conferred upon him the Order of the Golden Fleece. Piccolomini was an eminent commander of the period in which the great contest for religious supremacy waged in Europe, and was one of the most pronounced of the Catholic advocates.

PICKERING (pĭk'ĕr-ing), **Edward Charles**, astronomer, born in Boston, Mass., July 19, 1846. He graduated at Harvard University in 1865, and the following

year became instructor in physics at the Massachusetts Institute of Technology. The United States government sent him to Iowa in 1869 to witness an eclipse of the sun. His observations were published in the "United States Nautical Almanac," and in 1870 he made a similar mission to Spain. In 1876 he became professor of astronomy at Harvard, and while engaged at that institution aided in founding an auxiliary observatory at Arequipa, Peru. He was given many distinctions because of various discoveries of value, among them an election as associate to the Royal Astronomical Society of London, and membership in the National Academy of Sciences of America. He published "Elements of Physical Manipulation," and edited William von Bezold's "Theory of Color in Its Relation to Art and Art Industry."

PICKETT (pĭk'ĕt), **George Edward,** soldier, born in Richmond, Virginia, Jan. 25, 1825; died in Norfolk, Virginia, July 30, 1875. He completed the course of study at the West Point Military Academy by graduation in 1846, soon after entered the army as brevet second-lieutenant, and took part during the Mexican War at Vera Cruz, Contreras, and Chapultepec, receiving a captaincy for gallantry at the last named battle. After the close of the Mexican War, he served on garrison duty, and in 1861 resigned his commission and entered the Confederate army as colonel. He served with distinction on the Rappahannock River, was severely wounded at Gaines' Mill in 1862, and after recovery was promoted to the rank of major-general. Later he commanded with General Lee at Fredericksburg and Gettysburg, and in 1864 prevented the capture of Petersburg by Gen. B. F. Butler. In 1865 he commanded at Five Forks, and after being routed, surrendered with General Lee. He is particularly famous for a cavalry charge at Gettysburg in 1863. After the war he engaged in the life insurance business at Richmond.

PICTS (pĭkts), the race of people who inhabited the north part of England and the east part of Scotland at the time of the Roman occupation. They appear to have come in conflict with the Romans about 296 A. D., and were associated by Roman writers with the Caledonians. There is no certainty as to the language of the Picts, though they are generally regarded of Celtic descent. In 850 the Scots, whose original seat was in Ireland, subdued the Picts and became the predominating influence in Scotland. Remains of architectural structures erected by the Picts have been found in various parts of northern Britain.

PIEDMONT (pēd'mŏnt), the northwest principality of Italy, surrounded by France, Switzerland, Lombardy, and Liguria. It is so named because of its situation at the foot of the Alps, pied meaning foot and mont, mountain. The Po River and its tributaries supply an abundance of drainage. The soil is generally fertile, the climate excellent, and it constitutes one of the most productive parts of the Italian kingdom. Turin is the principal city. Its area is 11,200 square miles; population, 3,450,500.

PIERCE, Franklin, fourteenth president of the United States, born in Hillsboro, New Hampshire, Nov. 23, 1804; died in Concord, Oct. 8, 1869. He was the fourth son of Benjamin and Anna Pierce, and his father was distinguished as a brevet-major of the Revolution. He secured an academic education at Exeter, entered Bowdoin College as a classmate with John P. Hale, and graduated as third in his class in 1824.

FRANKLIN PIERCE.

Soon after he undertook the study of law at Portsmouth and Amherst, and was admitted to the bar in 1827, when he began a successful practice in his native town. He was an influential supporter of Andrew Jackson and became a member of the state legislature in 1829, serving four years consecutively. In 1834 he married Jane Appleton, daughter of Jesse Appleton, president of Bowdoin College, and in 1837 became a member of the United States senate. He resigned his seat in 1842 to resume the practice of law at Concord, and in 1846 enlisted as a private for service in the Mexican War, but was soon after commissioned colonel and later brigadier-general of volunteers.

Pierce joined the army under General Scott at Puebla in 1847, and soon accompanied it to undertake the capture of the city of Mexico. He was highly complimented by General Scott for bravery in the battles of Contreras and Churubusco, and participated in the battle of Molino del Rey and other engagements until the war closed. In 1848 he resumed the practice of law in Concord, and the legislature of the state in the same year voted him a sword of honor for distinguished services in the war. He was chosen a member of the state constitutional convention in 1850, became its president, and favored removing the property qualification required for voting and the religious test by which Roman Catholics were disqualified from holding office in the state. The democratic convention held at Baltimore in 1852 nominated him for president, and in the election that followed he received 254 electoral votes, while General Scott, the opposing candidate, received only forty-two. His administration was distinguished by the passage of the Kansas-Nebraska Bill, which in

effect repealed the Missouri Compromise; by the making of a treaty with Japan, and the agitation of the Nicaraguan affair. He was unsuccessful in securing the second nomination, though his personal friends supported him with much ardor. Upon the expiration of his term he spent three years in Europe, and on returning to America retired to his home at Concord, where he resided the remainder of his life.

PIEROLA (pee-rō'la), **Nicolas de**, soldier and president of Peru, born in Arequipa, Peru, Jan. 5, 1839. He studied in private academies and the university of his native city, and later became a member of the bar. After establishing a successful law practice, he interested himself in political affairs, and in 1869 became minister of finance. The political complications that existed caused him to be impeached at the end of his administration, and after being acquitted he went as an exile to Chile. He organized unsuccessful expeditions against the Peruvian governments in 1874 and 1877, and, when war began with Chile, he offered his services to the president of Peru, General Pardo, but they were not accepted. Later the president retired and Pierola became commander-in-chief of the Peruvian forces, but retired from the government in 1882. He visited the United States and Europe in the same year, and later settled in his native city. Though nominated for the presidency in 1894, he was defeated. The following year the Caceres government was overthrown, and Pierola was elected to the presidency.

PIERRE (pēr), the capital of South Dakota, county seat of Hughes county, situated in the central part of the State, on the Missouri River. It has a fine site near Old Fort Pierre, at the mouth of the Bad River, and is conveniently connected with other cities of the central west by railways. Its improvements include public schools, numerous churches, and modern municipal facilities. It is the seat of a United States Indian industrial school, and of the Pierre University, a Presbyterian institution, which carries adequate courses of study and is supplied with excellent apparatus. The principal buildings are those erected by the state, though it has also a number of fine business blocks and many beautiful residences. Population, 1900, 2,306.

PIERREPONT (peer'pont), **Edwards**, jurist, born in North Haven, Conn., March 4, 1817; died Sept. 23, 1892. He graduated at Yale in 1837, completed the course of law of that institution in 1840, and soon after established a successful practice in New York City. In 1857 he became judge of the superior court, and in 1862 was appointed to try cases of parties confined in the prisons and forts under the United States government. He supported Abraham Lincoln for the presidency, though he was a democrat, and afterward prosecuted the trial of J. H. Surratt, one of the conspirators implicated in the assassination of President Lincoln. In 1869-70 he was district attorney-general in New York, and in that capacity was an active opponent of the Tweed ring. President Grant selected him as attorney-general in 1875, but in 1876 he resigned to become minister to England. Pierrepont was a jurist of eminent ability, and prepared many able writings on international law. The University of Oxford, England, granted him a degree, and he was similarly honored by other prominent institutions.

PIETERMARITZBURG (pē-ter-mâr'its-bŭrg), a city of South Africa, capital of Natal, situated on a fertile plain, on a tributary of the Umgeni River. It is conveniently connected with several seaports and inland cities by railways. The city has a growing trade and contains a number of excellent public buildings. Among its facilities are schools and churches, and it is the seat of an archbishop's see. The city was founded by the Boers, and so named from Pieter Retief and Gert Maritz. Population, 23,250.

PIG. See **Swine.**

PIGEON (pĭj'ŭn), a group of rasorial birds found widely distributed, but most abundant in the tropical countries. They include many varieties, varying greatly in

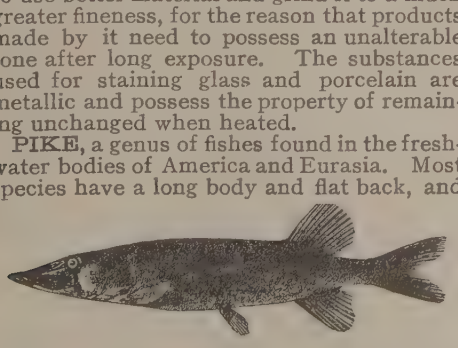
WILD PIGEON.

color and habit. Some writers call them doves, and ordinarily the terms are used interchangeably. The crop is quite large in most species, and the bill hard, with the upper mandible slightly curved at the point. Pigeons have quite large wings and are strong in flight. They perch in trees, but prefer to build their nests on some other elevated objects. The domestic variety breeds in barns or in houses specially constructed for them, where their familiar cooing may be heard most frequently. Both male and female sit on the eggs, and they appear to pair for life. Among the chief varieties of pigeons are the stock, carrier, pouter, tumbler, house, jacobin, fantail, and

runt pigeons. The passenger pigeon of North America was formerly met with in large numbers, but the excellent quality of its flesh caused hunters to search for it with great eagerness and it is now less common. Pigeon culture is an important industry in many countries, especially in India, China, Persia, Belgium, and Holland. The domestic pigeon is believed to be a descendant from the rock dove. It is cultivated both for its eggs and its flesh, but particularly for the latter. See **Carrier Pigeon.**

PIGMENTS (pĭg'ments), the coloring materials used in painting and dyeing. They are partly artificial and partly derived from the three kingdoms of nature. The principal kinds of coloring substances are derived from the mineral kingdom, and mineral coloring matters are usually added to substances derived from animals or vegetables. Most coloring substances used in painting are insoluble, and are ground and applied after mixing them with oil or some other liquid, the liquid drying after application without changing the pigments. The modes of painting are named from the vehicle and method used in applying the coloring substances, as oil colors, in distemper, in water colors, and in fresco. Many of the available pigments are native colored earths, as ochre (q. v.); others are separated from metallic compounds and other mineral substances, and a large number are prepared artificially from inorganic sources. Lakes are prepared from animal and vegetable coloring matters mixed with earthy bodies, and dyestuffs are obtained artificially from organic substances. A material used in painting should spread in a uniform coat over the surface, offer resistance to the change and action of weather, dry with reasonable quickness, and possess the property of forming an opaque covering over the surface on which it is spread. In preparing coloring substances for artistic work it is necessary to use better material and grind it to a much greater fineness, for the reason that products made by it need to possess an unalterable tone after long exposure. The substances used for staining glass and porcelain are metallic and possess the property of remaining unchanged when heated.

PIKE, a genus of fishes found in the fresh-water bodies of America and Eurasia. Most species have a long body and flat back, and



PIKE.

taper toward the tail with more than ordinary abruptness. Cycloid scales cover the body. The mouth is large, with the lower jaw projecting, and there is a large and powerful array of teeth. The dorsal fin is near the tail, by which it is aided in swimming with the greatest swiftness of any of the fishes. The common pike found in the rivers and lakes of North America occurs also in Eurasia, and is a fish of much value for its edible flesh. It rarely exceeds three feet in length, and weighs from six to twenty pounds. The largest species of pikes attain a length of from three to six feet, and live to a very old age; specimens have been found in which the age was estimated at 250 years. Pikes are very voracious and feed on almost any animal substance that they are capable of swallowing. The pike-perch is allied to the perch, but resembles the pike in having a long head and body. It occurs in the Great Lakes and many of the streams of the Mississippi valley, where it is caught as a favorite food-fish.

PIKE, Albert, author and soldier, born in Boston, Mass., Dec. 29, 1809; died in Washington, D. C., April 2, 1891. He was trained specially for school teaching, and taught successfully at Newburyport and Fairhaven. In 1831 he engaged in journalism at Fort Smith, Arkansas, where he secured the ownership of the "Arkansas Advocate" in 1834. He discontinued journalism in 1836, and engaged in revising the statutes of Arkansas. At the beginning of the Mexican War he entered the service as cavalry captain, and during the Civil War commanded the Indian allies of the Confederates. He became editor of the "Memphis Appeal" in 1867, but removed the following year to Washington, where he engaged in the practice of law until 1880. His writings include a large number of excellent poems and authoritative works on law and Masonry. His principal publications are "Hymns to the Gods;" "Ode to the Mocking Bird;" "An Indian Romance;" "Statutes and Regulations," and "Prose Sketches and Poems." Harvard University bestowed a degree upon him in 1859.

PIKE'S PEAK, an elevated summit of the Rocky Mountains, situated in Colorado, near Colorado Springs. It was discovered by Gen. Z. M. Pike, in 1806, while making explorations to find the source of the Mississippi. The mountain is rich in gold deposits, has a meteorological observatory, and is 14,134 feet high. Numerous lakes are within its vicinity. A mountain railway was built to its top in 1891, which has a length of nine miles and connects with Manitou Springs, a noted summer resort near its base.

PILATE, Pontius, fifth Roman procurator of Judæa, who succeeded Valerius Gratus to that position in 26 A. D. He was a Roman eques by rank, and had his residence as procurator at Cæsarea, but during festivals visited Jerusalem, where he presided over various bodies as official. Writers generally agree that Pilate was alike indifferent to justice and mercy, and that he was narrow-

minded in the administration of the law. When the Jewish priests had condemned Christ to be executed, they took him to Pilate, for the reason that the power to inflict capital punishment was not vested in them. Though Pilate protested the innocence of Christ, he permitted the Jews to crucify him, but afterward consented that his body be buried by Joseph of Arimathea. It is not certain what became of Pilate, but the best authorities indicate that he was removed from office in 36 A. D. and banished to Vienna by Caligula. According to tradition, Pilate afterward committed suicide. Pilate's wife was a secret disciple of Jesus, and is commemorated as a saint in the Greek Church.

PILGRIM FATHERS, the name generally applied to the Nonconformists who sailed from Southampton, England, in the Mayflower, and landed in the vicinity of what is now Plymouth, Mass., on Dec. 21, 1620. A party of Puritans left England in 1608 because of constant religious persecutions and settled in Holland. As they were unwilling to conform to the customs of Holland, they sent John Carver and Robert Cushman as commissioners, in 1617, to treat with the Virginia Company, then located in England, for territory in America. The whole company sailed from Delfthaven in the Speedwell to Southampton, where they embarked in the Mayflower for America on Aug. 5, 1620. There were 102 passengers on the Mayflower, who intended to land near the mouth of the Hudson River, but they were driven farther north by the wind. The leaders of the pilgrims were Carver, Cushman, Bradford, Brewster, and Miles Standish. A compact of government was written and signed before landing, and this document is regarded the first written constitution of which there is a historical account. The pilgrims are remembered by a monument at Plymouth, by Forefathers' Day, and by a Pilgrims' Hall erected under the direction of a Pilgrims Society.

PILCOMAYO (pĭl-kō-mī'ō), a large river of South America, having its source in the vicinity of Sucre, Bolivia, and after a circuitous course of about 1,500 miles toward the southeast it joins the Paraguay below Asuncion. It forms the boundary between Paraguay and Argentina. Forests of great value abound in its valley, but its navigation is obstructed in many places by shallows during the dry season.

PILLING (pĭl'ing), **James Constantine**, biographer, born in Washington, D. C., Nov. 16, 1846; died in Olney, Maryland, July 26, 1895. He studied at the Washington Gonzaga College, secured clerical work in various committees of congress, and in 1880 became chief clerk of the United States geological survey. In 1891 he was selected as ethonologist of the Smithsonian Institution. His writings are devoted largely to bibliography and ethnology, and contain many works of superior value. The principal publications include "Bibliography of the Eskimo Language;" "Bibliography of the Algonquian Languages;" "Bibliography of the Athabascan Languages;" "Bibliography of the Iroquoian Languages;" "Bibliography of the Wakashan Languages;" "Bibliography of the Languages of the North American Indians," and "Catalogue of Linguistic Manuscripts in the Bureau of Ethnology."

PILLORY (pĭl'lō-rў), a wooden frame designed for the punishment of offenders and criminals. This mode of punishment

PILLORY AND STOCKS.

was formerly of common use in England, but it was abolished there in 1837. It was employed principally for the punishment of those guilty of perjury, forgery, libel, petty larceny, and unjust weights, and for some time it was used in punishing common scolds and brawlers. The pillory consisted of a frame of wood, erected on a pillar or stand, and there were movable boards containing holes in which the head and hands of the offender were put. When in this position, the offender was exposed to the public view and insult, this constituting the principal punishment. A modified form of the pillory is still used in a number of Asiatic countries. It was used to a limited extent in the early English settlements of America.

PILLSBURY (pĭlz'bẽr-ĭ), **Charles Alfred**, born in New Hampshire in 1842; died Sept. 17, 1899. He settled at Minneapolis, Minnesota, at an early date in the history of that state, and in 1872 organized a company that built the largest flour mills in the world. These mills were sold to an English syndicate in 1889, who came in possession of the famous Pillsbury-Washburn mills, and the entire system was placed under a board of directors of which Pillsbury became president. He also built many large structures in which improved machinery was placed, and the excellent facilities

for crushing and disintegrating wheat by means of steam-rollers not only cheapened flour but greatly improved its quality. Pillsbury was the owner of patents on a number of improved devices, and thereby obtained much profit. He served as a republican in the senate of Minnesota from 1877 till 1887.

PILOT (pī'lŭt), an officer licensed by law to conduct vessels in and out of port, or within a particular district, designating the courses to be steered. Pilotage in the United States is controlled by congress, but the individual states are granted power to make particular regulations. A system of this kind has been found necessary in all countries, since there are always points of difficulty and danger near the shores and where ships are to land, it being the duty of the pilot to superintend the steering of the vessel so that the dangerous channels may be avoided. In many of the large foreign seaports compulsory pilotage has been abolished, and some of the states have greatly modified the system, though the larger insurance companies still require the employment of a pilot by a clause in their policies.

PILSEN (pĭl'sĕn), a city of Bohemia, situated at the confluence of the Mies and Radbusa rivers, fifty-two miles southwest of Prague. It is surrounded by a fertile agricultural and dairying country, which also contains valuable deposits of coal and kaolin. The city has railroad facilities, good municipal improvements, excellent schools and churches, and a number of public parks. Among the manufactures are clothing, spirituous liquors, paper, leather, machinery, stoves, earthenware, and enameled tinware. Several extensive iron and glass works are in the vicinity. The celebrated Church of St. Bartholomew was built in 1292. It was occupied by a Prussian army in 1866. The inhabitants are chiefly Germans and Czechs. Population, 50,280.

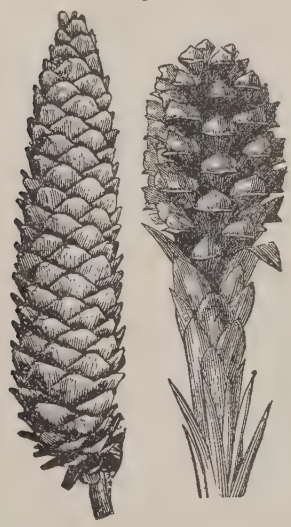
PINCKNEY (pĭnk'nĭ), **Charles Cotesworth**, statesman, born in Charleston, South Carolina, Feb. 25, 1746; died Aug. 16, 1825. He studied in South Carolina and in England, was attorney-general of the colony of South Carolina, and became a member of its provincial congress in 1775. His efforts were favorable to the colonists, and he became the aide-de-camp of Washington, serving with him in that capacity at the battles of Brandywine and Germantown, but soon after took charge of a command as colonel. In 1780 he was taken prisoner at the surrender of Charleston and was detained by the British until the war closed. He was a member of the federal convention in 1787 that framed the constitution of the United States, and in that body opposed making religion a test of qualification for office. President Washington appointed him minister to France in 1796, but the French directory refused to receive him, since a war was threatened at that time between France and the United States. However, the French made a proposal to avert war in case the United States would make a monetary payment, when Pinckney replied, "Millions for defense, but not a cent for tribute." He was soon after appointed major-general, and was the unsuccessful candidate of the federalist party for vice-president in 1800, and for president in 1804 and 1808.

PINDAR, celebrated Grecian lyric poet, born near Thebes in 522 B. C.; died in 442 B. C. He descended from a noble family, and under the direction of his father developed early skill in music. His talent for poetry caused his father to send him to Athens for instruction under Lasus of Hermione, the founder of an Athenian school of poetry. He returned to Thebes in 502 B. C., where he was further instructed by Corinna and Myrtis, two famous poetesses of Bœotia. His remarkable genius soon attracted the attention of many celebrated Hellenic rulers, and he was everywhere honored because of his scholarly and well-adapted compositions. Among his choral songs are a number composed for Alexander, king of Macedonia; Hiero, tyrant of Syracuse, and Arcesilaus, king of Cyrene. These and other compositions are remarkable for their independent character, since he gives well-planned advice, praise, and reproof to his patrons. Most of his life was spent at the courts of kings, and in witnessing festive games. To all of these he devotes attention in his poetical works. Only fragments of most of his compositions are extant, but his "Triumphal Odes" is preserved in its entirety. This work is devoted to recounting the victories won at the Pythian, Olympian, Isthmian, and Nemean games, and not only celebrates the achievements, but intermingles beautiful choruses and pious devotion to the gods, to whom he accredits much of his success. Many of the works of Pindar have been translated and published in various editions, particularly those having for their basis the legends of Grecian literature. The Athenians held him in special esteem, since he showed a particular fondness for Athens, but many of the Greek states honored him with statues.

PINDAR, Peter. See **Wolcott, John.**

PINE, the name popularly applied to any tree of the Pinus genus. They are distinguished by their woody cones and numerous two-seeded scales from the spruces, larches, firs, cedars, and other trees of the same family, but of a different genus. The leaves are evergreen, needle-shaped, and varying in length from about an inch to more than a foot. They grow in small clusters of from one to five, according to the species, and are sheathed at the base by thin, chaff-like scales. The leaves are so shaped at the inner and outer faces that they make a solid cylinder when pressed together. Pines are confined exclusively to the northern hemisphere, where

they grow in extensive groves in America, Europe, and Asia, but there is also a species in the Canary Islands. They thrive most abundantly in the temperate and cold regions, and are rarely found in the torrid zone. In size they range from mere shrubs to stately trees fully 300 feet high, and are found mostly in groves and extensive forests.



CONES OF PINES.

The pine forests of the tropical regions are confined to the elevated mountains, while in the northern and colder climates they grow successfully at sea-level, though those confined to the Arctic zone are mere shrubs. Seventy species have been described, of which twenty-six are native to the United States, though only about six of these have more than local importance for lumbering purposes. The white pine is the most important of all the American varieties, and is found in abundance in the regions of the Great Lakes and the St. Lawrence, and it extends far into Canada. It reaches a height of from seventy-five to 150 feet, measures about twelve feet around the lower part of the trunk, and in the larger forests it is beautiful for its straight grain and soft and light timber. The Norway pine is of next importance, and is found in the forests in northern Minnesota and Wisconsin, and in Canada, where it is called Canadian pine. Its wood is heavy and resinous, and is harder and more elastic than the white pine.

The yellow pine is found mostly in the southern states, from southern New Jersey to Texas, and is known in the markets as Georgia pine. There are two varieties—the short-leafed and the long-leafed—both of which have wood of a dark yellow to an orange color, and the long-leafed is especially desirable for ship-building. The Oregon pine ranges from British Columbia to Mexico. This variety grows in great forests and often attains a height of 300 feet. Its wood is hard and durable, has a yellowish color, and is valuable for all kinds of construction purposes. Several varieties yield large quantities of tar, turpentine, pitch, and resin, particularly the Norway pine and the yellow pine. The pine forests of Europe are most extensive in the Alps, the Pyrenees, and the Vosges, and there are vast forests in Russia and the Scandinavian peninsula. Large forests of pines occur in the Himalayas and other sections of Asia. The Scotch pine is a native of western Europe, and has been naturalized and planted extensively in America as an ornamental tree, being a favorite both on account of its excellently colored foliage and spreading branches.

PINEAPPLE, or **Ananassa**, a tropical plant much esteemed and cultivated for its fruit. It is so named because the fruit

PINEAPPLE.

somewhat resembles in appearance the cone of the pine. The plant consists of a central axis, with a tuft of rigid leaves springing from the roots to the upper part. A single spike of flowers appears at the upper end of a short flower stem, and there a single fruit develops. The pineapple is propagated by a tuft growth that appears at the upper part of the fruit. This plant is native to the tropical parts of America. It is from ten to twenty inches high, and grows wild in Brazil and other South American countries. Many of the varieties have been widely naturalized, and are extensively cultivated. They may be grown successfully in hot-houses, but their extensive culture depends upon a warm climate and an abundance of moisture. Large plantations of pineapples are produced in the Hawaiian Islands, the West Indies, the Philippines, and the southern part of the United States.

PINE BLUFF, a city in Arkansas, county seat of Jefferson county, on the Arkansas River, forty-one miles southeast of Little Rock. It is beautifully situated on an elevated bluff, has excellent railroad facilities, and is surrounded by a rich farming country. Among its manufactures are flour, lumber products, cotton-seed oil, cotton goods, leather, and machinery. It enjoys an extensive trade in cotton, tobacco, and cereals. The city has good public schools, numerous churches, and several libraries. Electric lights, waterworks, pavements, and telephones are among its facilities. Population, 1900, 11,496.

PINES, Isle of, an island situated thirty miles south of Cuba, in the Caribbean Sea, constituting the principal island of the Archipelago de Los Canareos. It is sixty miles long, fifty-five miles wide, and has an area

of 840 square miles. The coast has several prominent indentations, and near its shore are numerous smaller islands. It is in effect two islands, connected by a marsh. In the northern part the surface is diversified by a number of mountains, and in the southern it is low, flat, and sandy, but there are plains of great fertility, while the climate is healthful and mild. It is visited as a health resort because of its favorable climate and mineral springs. The products include tobacco, cattle, cotton, cereals, vegetables, and fruits. Excellent forests are abundant, including pine, cedar, mahogany, and other woods, while the mountains yield rock-crystal, marble, and other minerals. Columbus discovered the Isles of Pines in 1494. The local seat of government is at Nueva Gerona, but it has been for many years a dependency of the province of Havana, Cuba. Population, 1899, 3,199. This includes 267 Negroes, 198 foreign whites, and 2,480 native whites.

PINK, an extensive genus of plants, of which many species have long been cultivated in gardens. They include about 300

PINK. *a*, flower.

varieties, and embrace both annuals and perennials. Florists generally group the pinks into three general classes—the flakes, bizarres, and picotees—and the garden pink or peasant's-eye. Many varieties of these flowers have been grown as ornamental plants for ages, and they have been greatly improved by propagation. Those most extensively cultivated and best known are the garden pink, clove pink, and carnation, while the sweet william is sometimes classed with the clustered varieties. Pinks are native to the regions of the Mediterranean, but a single species is found in the northwest part of America. Those now cultivated in gardens have been acclimated by importation from Europe.

PINKERTON (pĭnk'ẽr-ton), **Allan G.**, American detective, born in Glasgow, Scotland, Aug. 25, 1819; died in Chicago, Illinois, July 1, 1884. He emigrated to Canada in 1840, and soon after removed to Chicago, where he became a deputy sheriff. He was appointed a detective of the Chicago police department in 1850, and from this originated the celebrated Pinkerton Detective Association. The plot to assassinate President Lincoln while proceeding to Washington was discovered by him, and at the beginning of the Civil War he became chief of the secret service of the Federal army. To him is due the credit of discovering many secret plots, and he broke up the Molly Maguires in Pennsylvania. He published a large number of works, among them "Railroad Forgers and the Detectives;" "Spiritualists and the Detectives;" "Gypsies and the Detectives;" "Spy of the Rebellion;" "Strikes, Communists, Tramps, and Detectives," and "Thirty Years a Detective."

PINNACE (pĭn'nās), a large boat carried by ships, usually from twenty-eight to thirty-two feet in length. It is somewhat larger than the cutter and smaller than the launch, and is rowed by six or eight oars. The name is sometimes applied to a single-masted vessel having oars or sweeps. A vessel of this class is capable of carrying from sixty to eighty tons, and is employed by some nations for coast defense.

PINS, the short pieces of wire, having a rounded or flattened head and a sharp point, in common use for fastening together pieces of paper and parts of clothing. Though an article of great utility, a pin represents only a small value, and is of comparatively recent invention. It is probable that pins were manufactured by the ancients, but their product was made largely of the bones of animals, particularly of fishes. Copper pins came into use at an early period of European history. At the beginning of the 15th century the manufacture of pins from copper, brass, and iron employed a large number of workmen, though they were made exclusively by hand. Modern pin-making by machinery dates from 1824, when Lemuel W. Wright, of Massachusetts, invented a pin-making machine, which he soon after patented both in this country and several others. The price of pins at once became greatly cheapened, though since then many improvements have been made, and it is thought that at present fully 35,000,000 pins are consumed daily in the United States.

Pins are made of various materials, but most generally of an alloy composed of two parts of copper and one part of zinc. There are various devices to manufacture pins, all

of which are propelled by machinery, and they do the entire work with little more than supervision by the workman. The metal alloy is cast in bars, and these are made into wire of the proper size. After winding the wire on a large reel, it is hung immediately above the pin-making machine. This machine is supplied with a pair of pincers so adjusted that they are capable of grasping the wire and drawing it from the reel, and the machine cuts the wire into the desired length. It is next sharpened and the point is finished by a revolving cylinder having the effect of a file, and is then carried to a die that partly makes the head. The head is completed in another similar die, and from it is dropped into a box below.

After a large number of pins have been prepared in this way, they are placed in a barrel containing sawdust and revolved rapidly to remove foreign matters from their surface. When taken from the barrel they have a bright appearance, and are ready to be put into paper sheets. Mechanical devices are used in papering; all the work of preparing the papers and adjusting the pins is done by the machines. A single machine is capable of making from 125 to 200 pins per minute. The color of pins depends on the kind of material used, but in some cases they are coated with tin by boiling them in weak nitric acid in which pieces of tin are placed. Pins of a black color are intended for mourning and are made from black wire and japanned, while others are made similarly but have heads of glass or porcelain.

PINTO (peen'tō), **Alexandre Serpa**, soldier and traveler, born in Douro, Portugal, April 20, 1846. He received his education at the Royal Military College, Lisbon, and soon after entered the Portuguese army in South Africa. He took part in the Zambezi war in 1869, and in 1877 entered upon an expedition to cross Africa from Benguela to Durban, reaching the latter place in 1879. The following year he became aide-de-camp to the king of Portugal, and subsequently made a number of exploring expeditions through southern Africa. He published "How I Crossed Africa," and was fittingly honored by many important scientific and geographical societies.

PIPE, an apparatus used by smokers of tobacco and other narcotics. The essential parts are the bowl and the stem; the former is the receptacle in which the substance is burned, and the latter serves to draw the smoke into the mouth. There are many varieties of pipes, and the materials from which they are made differ greatly, but usually clay or wood is used in constructing the cheaper grades. The finest grades of pipes are made of meerschaum, a kind of compact magnesium stone, and of carved briar-wood. The manufacture of pipes from meerschaum has reached its highest perfection in Vienna, where German manufacturers engage extensively in the enterprise, while large quantities of pipes are made with bowls of porcelain. Pipe-stems are usually made of different material from the bowls, in many cases of wood, bone, ivory, or amber, and usually these materials form the mouthpieces. Pipes made of costly material are trimmed with gold and other precious metals, and the most expensive are set with fine stones. The American Indians made pipes of baked clay and soapstone, and in most cases prepared the stems of wood. Pipes made wholly of baked clay were of frequent manufacture among primitive peoples. Many of the relics found with the remains of the moundbuilders include specimens of such pipes. Smoking tobacco in pipes is much more common in Europe than in America, the American smoker preferring to use cigars.

PIPIT (pĭp'it), or **Titlark**, a group of birds classed with the perchers, and in many respects resembles the lark. Many different species have been described, and some are widely distributed. The two species common to North America are the prairie lark and the American titlark, both of which sing while pursuing a circuitous flight through the air. The best known pipits of Europe are the rock, sea, and field; there are other varieties in northern Asia and southern Africa. They nest on the ground, and are easily distinguished by their simple and clear song.

PIQUA (pĭk'wą), a city of Ohio, in Miami county, on the Miami River, eighty-seven miles north of Cincinnati. It has convenient railroad connections with other trade centers and is situated on the Miami and Erie Canal. Among the manufactures are flour, carriages, corrugated iron, hardware, furniture, woolen goods, and linseed oil. It has excellent public schools, a public library, and fine church buildings. The surrounding country is agricultural and dairying. It is the seat of Schmidlapp Free School. Electric street railways, pavements, waterworks, and street lighting are among the improvements. Population, 1900, 12,172.

PIRACY (pī'rą-sў), the practice of robbery on the high seas, and which, if committed upon land, would constitute felony. Many of the nations have adopted statutes that make persons guilty of piracy who in any way aid pirates, or conduct trade with them. Most civilized nations regard persons who forcibly convey or remove others as slaves guilty of piracy. The penalty for conviction is a long term of imprisonment, but formerly the penalty was death, which extended not only to the principal, but to all those implicated as aids or supporters of pirates. Piracy is older than human history, and daring deeds of sea-rovers have come down to us from ancient peoples through tradition and history.

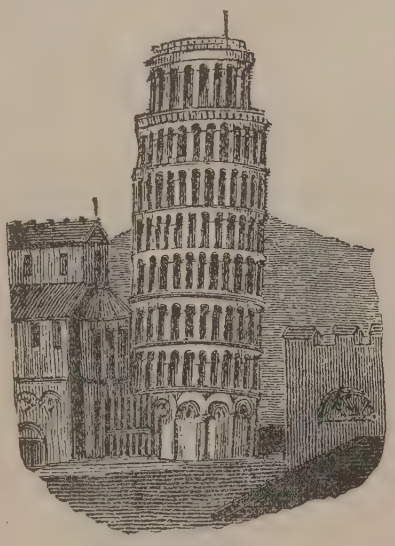
The Phœnician colonists regarded piracy an honorable occupation, and made it a pro-

lific source of profit. This was also the view taken by the early Grecians and Romans. Great bands of pirates had their seat for centuries in various regions bordering on the Mediterranean. Pompey was given command of a large military and naval force by the Roman government for the purpose of subduing the pirates who infested various regions adjacent to Rome. The Northmen were the most noted pirates of Europe, and commanded the northwestern coasts of Eurasia from the 7th to the 11th centuries. It was partly for protection against the sea-rovers that the Hanseatic League was formed by European cities. Southern Europe was harassed by pirates from Algeria and other regions of North Africa up to the early part of the 19th century, and many vessels came in contact with them while sailing the Indian and Atlantic oceans.

The American colonists were preyed upon by pirates in the 17th and 18th centuries. These pirates had their seat in the swampy regions of Florida and in the islands southeast of the United States. A pirate named Teach, and sometimes called Black Beard, was one of the most noted outlaws of this period. He preyed upon the Spanish possessions in the south and had trade relations with citizens of the United States as far north as Philadelphia, but was finally expelled from North Carolina by Governor Johnson. A London company sent Captain Kidd to subdue the pirates in 1696. He soon after adopted the practice and terrorized the eastern coast of North America, but was finally apprehended and executed in 1701. In 1841 the United States declared the slave trade a form of piracy, and it was recognized as such by England, Germany, Russia, and Austria. The system of international treaties among civilized nations has overcome piracy almost entirely, though it is still practiced to a limited extent in southeastern Asia.

PIRÆUS (pī-rē′ŭs), a city of Greece, situated five miles southwest of Athens. It is the seaport of that city. It site is on a peninsula of the same name and on the shore of a harbor formed by the Saronic Gulf. The city is renowned as the seaport of ancient Athens, and was connected with it by the famous Long Walls. The Romans under Sulla destroyed the city in 86 B. C., and during the long possession by Turkey it formed only a mass of ruins. Since then it has developed extensive manufactures and an important foreign trade. It is connected with Athens by a railway, and its harbor has been greatly improved. The modern city dates properly from 1834. It has excellent public buildings, and many good residences and business houses. Population, 34,600.

PISA (pee′zä), a city of Italy, capital of a province of the same name, on the Arno River, forty-four miles west of Florence. It has well platted and paved streets, and is connected with Leghorn, Florence, and other cities by an extensive railway system. Once a city of great wealth and renown, it still contains a number of evidences of its former prosperity. Among its most noteworthy buildings is a cathedral dating from the 11th century, in which there are paintings by a number of Italian masters. It has a dome of great beauty. Near this cathedral is the famous Leaning Tower of Pisa, a remarkable structure built in the 12th century by the German architect, Willheim of Innsbruck. This tower leans about fourteen feet from the perpendicular, is 180 feet high, and has eight stories. Upon its flat roof is an open gallery from which the surrounding country may be viewed. Opposite the cathedral is the Church of St. John, a remarkable building completed in 1162, in which the greatest sculpture of Nicola Pisano (1226-1273) may be seen. Another building of much renown is the Campo Santo, dating from 1228. Pisa has a splendid library of 125,000 volumes, which is situated in the university, an institution attended by 1,200 students. Connected with the university are a fine campus, a botanical garden, and a museum of natural history. In the 13th century Pisa had a population of 150,000, but from that time it rapidly decreased until the latter part of the last century, when it again began to advance in trade and manufacture. The manufactures embrace cotton and woolen goods, ribbons, silks, utensils, clothing, earthenware, and machinery.



LEANING TOWER AT PISA.

Pisa was founded by the Etruscans, but later became a part of Rome. Roman occupation dates from the 2d century B. C., but it retained its own municipal government for many years. In the 11th century it was organized as a republic, and soon after a rapid growth followed. At that time its

splendid works of art were constructed and its vast buildings and fortifications were erected. The German emperors governed it after the fall of the republic. Its greatest decline came about because of the extended contentions between the Guelphs and the Ghibellines, and at one time its inhabitants numbered less than 10,000. It was made a part of the kingdom of Italy along with the rest of Tuscany in 1860. Its name has been applied to a province since 1868, which has an area of 1,180 square miles. The city has a population of 68,650.

PISCICULTURE (pĭs-sĭ-kŭl'tŭr). See Fish-Culture.

PISIDIA (pĭ-sĭd'ĭ-a), an ancient country of Asia Minor, which occupied a region north of Pamphylia, and its northern boundary was formed by Phrygia. The surface of this region is mountainous, including the loftiest ranges of the Taurus Mountains. It is drained by the Cestrus and Eurymedon rivers, and contains a fresh-water lake about thirty miles long. The lake and rivers are noted for their fisheries. The inhabitants of this region were long noted as sturdy mountaineers, who resisted with great energy the encroachments and incursions of foreigners. Xenophon mentions the Pisidians in his "Anabasis," and subsequently they were referred to by various Grecian historians. Alexander the Great came in contact with them when conquering western Asia, but the Romans completely crushed their power and made them a part of the imperial territory. Their most noted cities included Antioch, Cremna, Sedge, Termessus, and Sagalussus, and from their sites modern antiquaries have excavated many remarkable relics.

PISISTRATUS (pi-sĭs'tra-tus), a tyrant governor of Athens, born about 612 B. C.; died about 527 B. C. He was the son of Hippocrates, and in his early political life supported the policy of Solon. Later he became allied with one of the three parties of Attica, becoming its recognized head, his wealth and scholarly eloquence making him one of the most influential leaders of his time. It is claimed that after a violent dispute with Megacles in the public assembly, he came to the market place with self-inflicted wounds, which he pretended were received from political opponents. The people became indignant at the apparent ill treatment and placed a guard for his protection. This guard was skillfully increased until he was able to control the city, and in 560 B. C. Megacles fled, but Solon remained at Athens and continued to oppose the dictatorial policy of Pisistratus. Though termed a tyrant, he was by no means oppressive, but wisely enforced the laws of Solon and provided for the material welfare of the city. After six years he was compelled to surrender his authority, but he succeeded in making himself master of the city a second time by the aid of Thebes and Argos, and after five years was again driven from Athens only to return after a short time. The rule of Pisistratus is noted for the erection of many public buildings and the establishment of libraries. He made ample provisions for the employment and support of the poor. He is credited with the collection of the poems of Homer, though the earlier authorities do not make mention of this. His country enjoyed greater prosperity and longer peace during his reign than in a majority of the administrations. In the latter part of his reign he conquered Maxos. His sons succeeded him.

PISTOL. See Revolver.

PITCAIRN ISLAND (pĭt-kârn'), an island of the South Pacific Ocean, situated between Australia and South America, in the southeastern part of the Polynesian Archipelago. It is about one mile wide and two and one-fourth miles long. It was first visited by Carteret in 1667. The surface is fertile, though the coasts are high and rocky, and there is an abundance of timber. This island is of itself unimportant, but it is celebrated on account of its becoming the dwelling place of a number of mutineers. In 1789 the British ship Bounty was sent from India to the West Indies, but when it reached Tahiti, one of the Caroline Islands, where a supply of bread-fruit trees was to be gathered, the season for taking them up had not arrived. For two months the crew was idle, and during this time became demoralized and soon after mutinied. The captain and those who would not join them were put off in a boat and set adrift on the ocean, and after forty-six days reached inhabited land. However, the mutineers returned to Tahiti, and nine of these with a number of native men and women sailed from Tahiti in 1790 and formed a settlement on Pitcairn Island, which was then uninhabited.

An Englishman named Alexander Smith changed his name to John Adams, and became recognized as the leader of the little colony. Several of the Tahitians were murdered as the result of quarrels, but the others remained on the island, and Adams directed educational and Christian instruction. It was thought that the Bounty and its occupants had been lost at sea until in 1808, when Captain Folger with the American ship Topaz discovered them, but Adams was the only one of the mutineers still alive. However, there were a large number of fine farms and houses on the island, and the descendants of the mutineers had advanced remarkably in educational and industrial arts. A British vessel visited the island in 1831, when the inhabitants numbered eighty-seven, and in the same year transferred them to Tahiti, but they returned to Pitcairn within a year. In 1856 they numbered 194, and it was found that the island was too small to support that number. They were accordingly removed to Norfolk Island, but

about forty soon after returned. The population at present is about 125.

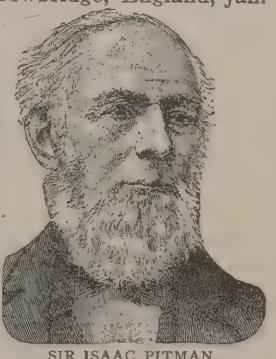
PITCH, a product obtained by boiling tar until the volatile naphtha is driven off. It may be obtained from wood and coal tar, and from stearine residue, bone tar, and petroleum. Pitch has a dark color and brilliant luster, and is solid at ordinary temperatures. It is used extensively for closing up seams in shipbuilding, for keeping wood from decay and iron from rusting when exposed to the weather, and for making artificial asphalt. A grade produced in Finland is called Burgundy pitch, and has medical properties. The term mineral pitch is sometimes applied to asphalt.

PITCHER PLANTS, a group of plants remarkable for having leaves or petioles formed like pitchers, and in which more or less fluid is stored. There are two general divisions, known as the American and East Indian pitcher plant families. The American includes five or six species, found mostly in the eastern part of the United States, California, and Canada. The East Indian pitcher plants include a large number of species and are found widely distributed in Australia, the East India Islands, and southern Asia. These plants are half shrubby or herbaceous, and grow best in half swampy regions. Each leaf is prolonged and forms a cup-like vessel resembling a pitcher, and over the top extends a lid that may be regarded the true leaf-blade. The plant secretes the fluid. This fluid attracts insects, and they are often found drowned in it. Darwin classed these plants among the insectivorous, for the reason that the drowned insects are dissolved and absorbed by the plants as nutritious matter. Pitcher plants are cultivated to some extent in hothouses for their flowers and foliage.

PITCHER PLANTS.

PITH, or **Medulla**, the cylinder of soft, spongy tissue in the center of stems or branches of exogenous plants. The stems of young plants are composed entirely of pith and bark, but later the woody fiber develops, and the pith is reduced until it forms only a small cylinder in the developed stem. Pith is composed of cellular tissue, which in young plants contains starch, but later air takes its place. The cells are smallest at the circumference. There is a connection between the pith and the bark by medullary lines, these serving to convey secretions from the bark to the interior.

PITMAN, Sir Isaac, educator and inventor of the Pitman system of shorthand writing, born in Trowbridge, England, Jan. 4, 1813; died Jan. 22, 1897. He secured his education at the Normal College under the direction of the British Foreign School Society. In 1832 he became a teacher at Barton-on-Humber, and subsequently taught at Wotton-under-Edge. In 1839 he removed to Bath, where he organized the Phonetic Society, and later established a printing office to publish the text-books of shorthand used in his work. He established the "Phonetic Journal," a periodical devoted to reforms in writing and spelling, and published a large number of manuals and text-books on phonography. The Pitman system of shorthand is used by a large per cent. of reporters in America and Great Britain, and it has been adapted for use in the German, French, Dutch, Spanish, Italian, Turkish, Japanese, and many other languages. Gold medals were presented to him by the phonographers of the United States, and in 1887 he received a marble bust of himself at a phonographic association meeting. Queen Victoria knighted him in 1894. His most important publications include "Writing by Sound" and "Phonographic Reporter's Companion."



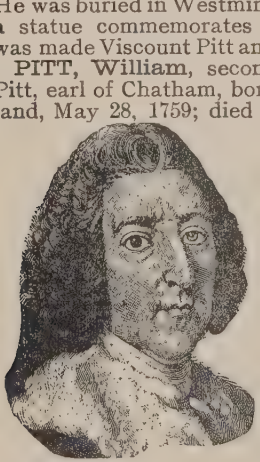
SIR ISAAC PITMAN.

PITT, William, earl of Chatham, noted orator and statesman, born in Cornwall, England, Nov. 15, 1708; died May 11, 1778. He was the son of Robert Pitt, a country gentleman, studied at Eton and Oxford, and after graduating made an extensive tour of Europe. In 1735 he was elected to parliament, where he supported Frederick, prince of Wales, in opposition to the king and Walpole, the latter being minister at that time. His aggressive attitude led the government to deprive him of his commission, but his ability and eloquence caused his influence in public affairs to increase steadily. When Walpole was defeated in 1742, Pitt again entered the government service and soon after became secretary of state. He became prime minister at the beginning

of the Seven Years' War, in 1757, and during the four years of his ministry Great Britain attained many of its greatest achievements. The forces of France were defeated everywhere—on the Rhine, in India, in Canada, and in Africa.

Pitt was the director of all the great movements of the military and naval forces, and to him may be attributed in a large measure the winning of both India and Canada. He opposed the tax act proposed by parliament, on the ground that taxation should not be imposed upon any colony without representation, but later he modified his view and vigorously opposed those wishing to grant independence to the colonies. At the accession of George III. he resigned his office, but continued to exercise much influence in the government, both domestic and foreign. Pitt was one of the most aggressive English statesmen opposing American independence, and when a treaty was made between the American colonies and France, he looked upon proposals of peace as overtures to prostrate Britain before the Bourbons of France. His last noted speech before the house of lords was in opposition to making peace with the colonies and the acknowledgment of the independence of the United States, and four days later he died at Hayes. He was buried in Westminster Abbey, where a statue commemorates him. In 1766 he was made Viscount Pitt and earl of Chatham.

PITT, William, second son of William Pitt, earl of Chatham, born near Kent, England, May 28, 1759; died Jan. 23, 1806. He was born at the time his father was honored as the most illustrious English citizen. His early education was gained at home under the supervision of his parents, and when but fifteen years of age he had a wide knowledge of mathematics and ancient languages. He was educated at Cambridge, and in 1780 became a member of the bar. After making a tour of Europe, he stood as a candidate for parliament from the university, but was defeated. However, he entered parliament in January, 1781, and on Feb. 26 of the same year made his first speech in favor of the economical reforms proposed by Burke. In 1782 he became chancellor of the exchequer under the earl of Shelbourne. When the Shelbourne ministry was defeated the following year on account of the preliminary treaty of peace with the United States, King George III. offered to appoint Pitt as premier, but this he declined without hesitation, though when the ministry of Portland was dissolved soon after he accepted the appointment. His administration of the treasury was noted for marked financial ability, and his ministry, beginning in 1784, though he was then but twenty-five years of age, became one of memorable strength.



WILLIAM PITT.

Among the notable events taking place at the time of his ministry is his regency bill of 1788, the French Revolution, the war with France in 1793, and the union with Ireland in 1800. Pitt resigned the ministry in 1801 because of the king's opposition to concessions to Irish Catholics, but after several years he was again appointed to the ministry. His greatest energy was directed against the growing power of Napoleon. When the battle of Austerlitz was won by that commander, Pitt was thrown into profound sorrow, which hastened his death. There is a difference of opinion among biographers as to the merit of Pitt's statesmanship, some according him an exalted position and patriotic sentiments, while others regard him as jealous for public favor and quite devoid of original ideas. He was buried in Westminster Abbey beside his father.

PITTSBURG (pĭts'bûrg) a city of Kansas, in Crawford county, fifty-five miles east of Independence. The surrounding country has valuable deposits of coal and zinc, and produces cereals and fruits. Among the manufactures are metalware, cigars, brick, clothing, earthenware, and machinery. The city is conveniently connected by a number of principal railroads with other trade centers, and has excellent school and church buildings. It has a large trade in farm produce and coal. The zinc works employ about 1,000 persons. Pavements, waterworks, telephones, electric lights, and street railways are among its improvements. Population, 1900, 10,112.

PITTSBURG, a city of Pennsylvania, in Allegheny county, at the confluence of the Monongahela and Allegheny rivers, 254 miles northwest of Philadelphia. It is the second largest city of Pennsylvania, has a large number of railroads, and there are excellent navigation facilities by the Ohio River and by canals. The surrounding country is noted for its extensive deposits of coal and natural gas. Bituminous coal deposits averaging a thickness of eight feet are exposed at the slopes of the hills in that region, and a large portion of the product of the state is mined there. The coal trade is extensive and formerly vast quantities were consumed in the factories of the city, but since 1883 the large gas deposits are utilized quite extensively for that purpose, the supply being conducted through pipe lines into the city. There are extensive improvements on the river, by which steamboats may ply safely in the different parts of the city, and load and unload the large cargoes of merchandise and supplies entering into its

extensive trade. Among the manufactures are a large variety of products, but the principal output is iron and steel, and in these products the city takes the highest rank in the United States. This industry employs 22,000 persons, and has an annual output valued at $50,500,000. Other manufactures embrace tobacco products, iron and steel pipe, spirituous liquors, iron and steel nails, iron and steel boats, glass, pottery, brick and tile, armor plate, machinery, utensils, and clothing.

Formerly lofty hills occupied much of the present site of Pittsburg, but as the city has grown they have been reduced by grading, and Herron Hill is now the highest eminence, being elevated 535 feet above the general average of the surrounding region. The city is well lighted by electric and gas lights, and has excellent systems of sewerage, pavements, and waterworks. An extensive system of electric street railways traverses both the city and many of the adjacent suburbs and towns. Among the principal buildings are the city hall, a fine white sandstone structure on Smithfield street; the county courthouse, the German Lutheran Church, the first and third Presbyterian, and the Trinity and St. Peter's churches. The business buildings of the city are largely of native stone, but modern fire-proof buildings of steel have been erected to a large extent in recent years. The city is supplied with an excellent system of public schools, and there are a number of institutions of higher and professional learning.

Pittsburg is the seat of the Western Pennsylvania University, an institution completed in 1890, which now has a library of 15,000 volumes. Other institutions include six colleges and seminaries, the Homœopathic Dispensary, the Pittsburg Infirmary, the West Pennsylvania Hospital, the Pittsburg Dispensary, the Roman Catholic Orphan Asylum, and many other homes and hospitals. There are about 300 churches, representing nearly all the leading denominations. Substantial bridges cross the rivers and canals, the most noteworthy being the handsome bridge over the Ohio, completed in 1890, which connects the city with Bremot's Island. Pittsburg occupies the sites of the French Fort Duquesne and the English Fort Pitt. Both the French and English claimed it from 1755 till 1758. Washington was with the British General Braddock, in 1755, when that official was defeated by the French and Indians at Fort Duquesne, but it fell into the hands of the English in 1758. The city was named in honor of William Pitt, earl of Chatham, and received its first charter in 1816. It now ranks as the eleventh city of the United States. Population, 1900, 321,616.

PITTSFIELD (pĭts'fēld), a city in Massachusetts, county seat of Berkshire county, on the Housatonic River, 150 miles west of Boston. It has a beautiful site on an elevated plateau, is conveniently connected with eastern trade emporiums by railways, and in its vicinity are a number of lakes. Among the manufactures are paper, shirts, electric machinery, brass castings, shoes, cotton and woolen goods, silk textiles, and utensils. It is the seat of a training school for nurses, an old woman's home, and the hospital of the House of Mercy. Among its noteworthy buildings are many churches, and a fine county courthouse. The municipal facilities are modern, and include public lighting, street railways, a public library, and waterworks. Population, 1900, 21,766.

PITTSTON (pĭts'tŏn), a city of Luzerne county, Pennsylvania, on the Susquehanna River, 105 miles northwest of Philadelphia. It is surrounded by a region rich in anthracite coal, has excellent railroad facilities, and is connected by two bridges with West Pittston, a suburb on the west bank of the Susquehanna. Among the manufactures are hardware, terra cotta, hosiery, lumber products, engines, paper, and leather. It has an important trade in coal and merchandise. Population, 1900, 12,556. West Pittston in 1900 had a population of 5,846.

PIUS, the name of nine popes, six of whom are treated in special articles below. Little is known of Pius I., but it is certain that he was bishop of Rome from 142 to 157 A. D. It is thought that he was born at Aquileia, Italy, and that he suffered martyrdom. Pius III. was born at Siena, May 9, 1439; died Oct. 18, 1503. He became pope on Sept. 22, 1503, and it is thought that his death, which occurred the same year, resulted from poison administered by an enemy. Pius VIII. was born at Cingoli, Nov. 20, 1761; died in Rome, Nov. 30, 1830. He became pope in 1829, and was succeeded by Gregory XVI. in 1831. See Pope.

PIUS II., Æneas Sylvius Piccolomini, pope of Rome, born at Corsignano, Oct. 18, 1405; died Aug. 14, 1464. He received a liberal education, and when twenty-six years of age became secretary to the cardinal of Fermo. Emperor Frederick III. of Germany appointed him to office in the imperial court, and named him as ambassador of a diet at Rattisbon. In 1446 he became the German ambassador to Pope Eugenius IV. for the purpose of negotiating papal submission to Germany. His skill and trustworthy disposition caused the pope to retain him as secretary. In 1447 Pope Nicholas V. created him bishop of Trieste, and in 1456 he was made cardinal by Callistus III. He succeeded the latter as pontiff in 1458, and immediately published a bull in opposition to the proposition to create a general council to the pope, though previously he had favored the superiority of such a council. He is noted as superior in ability and vigor to the popes that preceded him.

PIUS V., Michele Ghislieri, pope of Rome, born in Bosco, near Allessandra, July 17, 1504; died May 1, 1572. He descended

from poor parents, entered the Dominican Order in 1528, and Pope Paul IV., being attracted by his eminent ability, appointed him bishop of Sutri in 1556. The following year he was made cardinal, and on Jan. 8, 1566, was chosen as pope to succeed Paul IV. His administration is noted for great rigor in endeavoring to reform the morals of Rome, where he prohibited public amusements of various kinds, particularly demoralizing exhibitions and bull-fights. He was a supporter of the Inquisition, and alike persecuted Jews and Protestants who refused to embrace his faith. He excommunicated Queen Elizabeth in 1570. In the latter part of his pontificate he joined Venice and Spain in an expedition against the Turks, and on Oct. 7, 1571, the great naval victory of Lepanto was won by the allied forces. Clement IX. canonized him in 1712.

PIUS VI., Giovanni Angelo, pope of Rome, born in Cesena, Dec. 27, 1717; died Aug. 29, 1799. He became secretary to Benedict XIV., and Clement XIV. appointed him cardinal. He succeeded the latter as pontiff on Feb. 15, 1775. His election caused him to become involved in difficulties, and in 1798 General Berthier marched into Rome and proclaimed it a republic, demanding that Pius renounce temporal authority. However, he refused to comply with this request, and was accordingly imprisoned at Florence. Later he was confined at several other cities, remaining in confinement until his death. The early part of his reign was disturbed by difficulties with Leopold of Tuscany and Emperor Joseph of Austria, who deprived him of some of his territory, but his administration as a whole showed him to be fair-minded and devoted to reforms. During his reign Rome was greatly improved by numerous substantial buildings, parks, thoroughfares, and modern facilities. He attracted many artisans and learned men to Rome.

PIUS VII., Gregorio Barnaba, pope of Rome, born in Cesena, Aug. 14, 1742; died Aug. 20, 1823. He joined the Benedictine Order at an early age, and engaged as teacher of philosophy and theology at Parma and Rome. First bishop of Tivoli, he soon after became cardinal, and on March 14, 1800, succeeded Pius VI. as pontiff. French troops had occupied Rome for a number of years, but they were withdrawn shortly after he became pope, and papal authority was restored. He selected Cardinal Consalvi as his secretary, who was soon after sent to Paris to complete a treaty with Napoleon whereby religion was restored in France on the former basis of connection with Rome. Napoleon required Pius to come to Paris in 1804 that he might crown him as emperor, and while there was shown great distinction, but it was sought to secure a modification of the treaty then existing between France and the papal state. However, relations soon began to be less friendly in character. In 1808 Napoleon again sent troops to occupy Rome, and he annexed by proclamation the provinces of Urbino, Ancona, Macerata, and Fermo to Italy.

Pope Pius protested against the usurpation of power by Napoleon, but the latter issued a decree annexing Rome to France in 1809. The French general soon after removed the pope from Rome to Florence, and later to Grenoble and Savona. He was finally transferred to Fontainebleau in 1812, where he was compelled to sign a concordat annexing all of the Roman states to France. The disastrous campaigns of Napoleon in 1813 modified his policy somewhat, and, when the allies finally occupied Paris in 1814, steps were immediately taken to restore the pope to his possessions. The congress of Vienna took final action, and on May 24, 1814, Pius reëntered Rome amid great public rejoicing. He was compelled to leave Rome when Napoleon returned from Elba, but after the defeat at Waterloo he remained undisturbed in his possessions until his death. Pius is noted for marked benevolence and Christian charity, and promulgated and enforced laws with much moderation and wisdom. He reëstablished the Society of Jesus in 1814.

PIUS IX., Giovanni María Mastai Ferretti, pope of Rome, born at Sinigaglia, May 13, 1792; died Feb. 8, 1878. He was the fourth son of Count Jerome, who designed him for a military life, but later he studied theology and received holy orders. After ministering for some time in Rome, he was sent to Chile as auditor of the vicar-apostolic, and in 1846 succeeded Gregory XVI. His influence had been with the party advocating reforms, and his accession was signalized by the release of 2,000 political prisoners. Soon after he issued a general amnesty for political exiles. It was his design to govern Italy under a liberal constitution, and to provide for a legislative department of two branches, one appointed by the pope and the other chosen by popular suffrage. However, before these measures could be adopted the Revolution of 1848 spread rapidly, and in 1849 a Roman republic was proclaimed under the leadership of Mazzini. The pope found safety in escaping to Gaeta, whence he issued an address to the sovereigns of Europe in remonstrance to the course of events. The president of France, Louis Napoleon, sent an expedition to Italy for the purpose of restoring the pope. Garibaldi and his army of Italian patriots were defeated, Rome was occupied on July 3 of the same year, and Pius returned in April, 1850.

Pope Pius then assumed a more conservative course in his government, which he left largely to his secretary of state, Cardinal Antonelli. Among the important events of his reign are included the bull of 1854, declaring that the immaculate conception of the Virgin Mary is a church doctrine, and the assemblage of the Vatican Council that

held a session in Rome from December, 1869, to July, 1870. This council was composed of bishops from all parts of the world, and was the first to proclaim officially the doctrine of papal infallibility. The military forces of Victor Emmanuel took possession of Rome in 1870 and made it the capital of United Italy, and subsequently the pope exercised only spiritual power. His pontificate is the longest on record, thirty-two years.

PIUS X., Josephum Sarto, pope of Rome, born at Riese, Italy, June 2, 1835. He studied at Castel Franco and Padua, and in 1858 was ordained priest. In 1875 he was made a canon of the cathedral at Treviso, and in 1884 became bishop of Mantua. Leo XIII. made him a cardinal and created him patriarch of Venice in consideration of his efficient work as bishop. The conclave of cardinals elected him pope in 1903.

PIZARRO (pe-zăr'ro), **Francisco,** soldier and conqueror of Peru, born in Truxillo, Spain, about 1471; slain June 26, 1541. He was a son of Gonzalo Pizarro, a distinguished soldier, but his education was entirely neglected, and he was not even taught to read or write. His first employment was that of a swineherd, but later he abandoned this uncongenial work and embarked at Seville to seek a fortune in America. He engaged in several military exploits in Panama, and accompanied Balboa on his expedition across the isthmus to discover the Pacific Ocean. The rumors that a country toward the south possessed gold and silver in abundance kindled his ambition to conquer it.

He organized a company in partnership with Diego de Almagro, an experienced adventurer, and in 1524 proceeded southward as far as Quemada Point. Later the two adventurers were joined by Hernando Lugue, and an agreement was formed that the wealth discovered should be divided equally among them. The expedition proceeded southward by two ships, and in the latter part of 1526 they discovered Peru, but their force was insufficient to conquer the Peruvians. Pizarro returned to Panama and thence sailed to Spain, where he induced the government to place an adequate force at his disposal, with which he reached Panamă in 1531. In May, 1532, he landed at Tumbez, Peru, with three vessels and about 200 men, and at once began the march inland. Cuzco was the capital of the Peruvian Empire, where the Inca Atahualpa was captured, and after a ransom of several million dollars had been extorted he was treacherously assassinated.

An extended quarrel arose between Pizarro and Almagro for the possession of the territory, the latter claiming the title of governor of Cuzco. In a protracted civil strife that resulted, Almagro was captured, and in 1537 he was strangled. Pizarro next proceeded against the followers of Almagro with great cruelty, but a conspiracy was formed for his assassination, and this was finally brought about by a son of Almagro in the palace of Lima. Pizarro is a prominent figure in the conquest of a large part of South America, and is the founder of the city of Lima, which he platted in 1535, and in the cathedral of that city his remains are preserved. Brave and resolute, he pushed forward the conquest of the new world with a spirit that only physical endurance and perseverance can make at all possible, though writers generally describe his treatment of the Incas and his opponents as extremely cruel.

PIZARRO, Gonzalo, soldier and adventurer, born in Truxillo, Spain, about 1472; slain April 8, 1548. He was a half-brother of Francisco Pizarro, became a soldier at an early age, and joined the expedition organized by the latter for the conquest of Peru. He was given command of an army of 350 Spanish soldiers and a large number of Indians, and was appointed governor of Quito in 1540. Many of his soldiers perished in the icy winds in endeavoring to cross the Andes while marching toward the east, but after enduring many hardships, he descended the eastern slopes and discovered the Napo River, a large tributary of the Amazon. While there he and his army were reduced by a lack of supplies, and fully 2,000 of the Indians accompanying him died. After two years of absence he returned to Quito. Soon after the assassination of Francisco he raised an army to dispossess Blascó Nunez, who had usurped power as viceroy. In a battle that followed Nunez was slain, but in 1548 Pizarro was defeated in a battle near Cuzco. He was taken prisoner and soon after beheaded.

PLAGUE (plāg), or **Glandular Pestilence,** an epidemic disease attended by violent fever. It is characterized by burning carbuncles in the glands of the groin and arm-pits, and is now believed to be almost identical with the most severe forms of typhus fever. It is produced by the absorption of a poison generated by decaying animal matter combined with heat, moisture, and bad ventilation. Its spread is hastened by humid heat, poor sanitary regulations, and insufficient water, food, air, and light. The plague has been generated in many regions by the famines caused by the ravages of locusts, and the poisonous infection of the air resulting from the decay of their bodies. Persons exposed to it become seriously affected within a few hours to three weeks, and like other malignant fevers it has various stages, death resulting within a period of a few hours to three days. Patients who survive the fifth day usually recover under favorable medical treatment.

The first symptoms are restlessness, followed by shivering, rise of temperature, and serious pain in the head and back. Glandular swellings appear in about twenty-four to thirty-six hours, these being mostly in the neck, groins, and arm-pits, and after break-

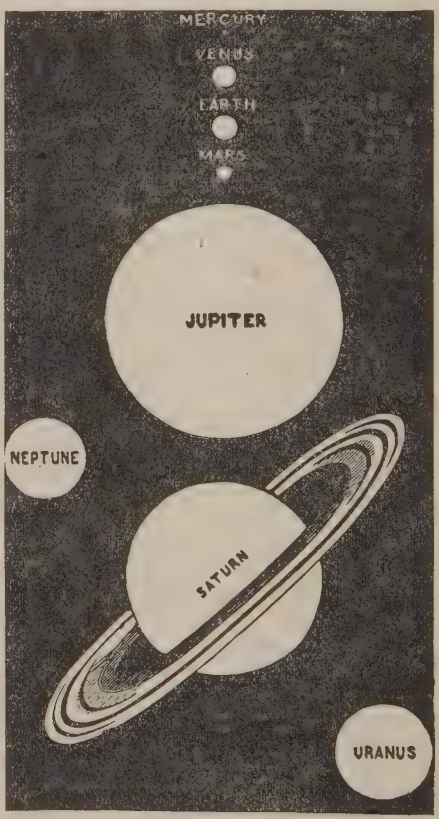
ing open give rise to suppuration and the oozing of blood from the surface. The disease is highly contagious, and there is no remedy that has proved reasonably successful, the best advice being to avoid the disease by careful observation of wholesome sanitary rules. There are evidences that the plague ravaged different countries in the most ancient times, the first on record in Europe being in Athens in 430 B. C. Josephus recorded a disastrous plague in Jerusalem in 72 A. D., and in 164-180 it spread over a large part of the Roman possessions. Another wide-spread plague visited Rome in 262, when the daily mortality was 5,000 persons. It appeared in most of Europe as a result of the Crusaders returning from Asia, when it became known as the black death, and in the period from 1347 to 1350 about one-half the population of Europe was destroyed.

The city of London has been particularly unfortunate in being visited by the plague, and the estimates place the loss of lives in 1603 at 36,270; in 1625, at 35,500; in 1636, at 13,485; and in 1665, at 68,650. Other notable ravages of the plague cost Marseilles 60,000 lives in 1720; Messina, 43,500 in 1743; and in 1771 it visited Russia, the Scandinavian peninsula, Germany, and many other regions of Europe. A disastrous plague appeared in Egypt in 1844, and another raged in southeastern Russia, Arabia, Persia, and Tripoli in 1878-79. The improvements effected within recent times in the sanitary regulations of cities, such as supplying pure water, extensive sewerage systems, and adequate lighting of buildings, have all had wholesome effects in preventing the appearance of the plague. It is also counteracted by additional hospital facilities and advancement in medical science.

PLAINFIELD, a city of New Jersey, in Union county, twenty miles southwest of New York City. It is conveniently connected with other trade centers by railways and electric car lines, and is a favorite place of residence of New York business men. The city has excellent public schools, a seminary, an academy, and several libraries. It is the seat of Muhlenburg Hospital. Among the manufactures are clothing, carpets, oilcloth, carriages, printing presses, dye, machinery, cigars, and edged tools. The surrounding country is agricultural and fruit-growing. Population, 1900, 15,369.

PLANE TREE, a genus of forest trees generally known as the buttonwood. A number of different species are widely distributed. The buttonwood native to the United States is one of the largest deciduous trees in America, and is found in the forests skirting the rivers of the north-central part. Along the Ohio River the trees of this class have a diameter of from ten to fourteen feet, and are without branches to a height of from fifty to seventy feet. The leaves are palmate and alternate, and the wood is fine-grained. When seasoned, it assumes a dull red color and takes a good polish, but its liability to decay when exposed to the weather renders it of comparatively small value for many purposes. The plane tree of Eurasia is quite similar to that of North America, and was a favorite among the Greeks and Romans for ornamental and shade purposes. It is still planted in many European cities, fine specimens of it being numerous in Constantinople, Rome, Vienna, Berlin, London, and Paris. The plane tree thrives best in an alluvial soil when well watered.

PLANETS, the celestial bodies that revolve around the sun and receive light and heat from it. They are divided into primary



COMPARATIVE SIZES OF THE PLANETS.

and secondary, the former revolving around the sun and constituting the planets proper, while the latter pass around the primaries and are known as satellites. Both planets and satellites are dark bodies, and the light they give off is merely reflected sunlight. Both shine with a steady radiance, while the fixed stars give off a twinkling light, and the planets appear brighter than most stars because they are nearer to the sun and to us. The planets are usually divided into inferior

and superior; the inferior being Mercury and Venus, whose orbits are within that of the earth; and the superior, Mars, Jupiter, Saturn, Uranus, and Neptune, whose orbits are greater than the earth's orbit. Those named above are classed as major planets to distinguish them in reference to their great mass, the regularity of their arrangement, and their nearly circular orbits. The minor planets include several hundred bodies invisible to the naked eye. They revolve around the sun between the orbits of Mars and Jupiter.

Only five of the major planets were known to the ancients, namely, Mercury, Venus, Mars, Jupiter, and Saturn; the earth was not classed as a planet at that time. William Herschel discovered Uranus in 1781. Neptune was discovered in 1846 by U. J. J. Leverrier as a result of the discovery of an astronomical law governing the distribution of planets. John C. Adams (1819-92), discovered Neptune independently. There is a close resemblance between Mercury, Venus, the earth, and Mars, particularly in their size, density, and weight. Jupiter is the largest of the planets, and is about 1,200 times greater in volume than the earth. In 1859 M. Lescarbault, a French physician, discovered a planet which was afterward named Vulcan, though it is not usually recognized as belonging to the major planets. Its distance from the sun has been estimated at 13,000,000 miles, and its periodic time or year at twenty days. All the other planets are treated in special articles.

Below is a table showing the important features of the major planets:

NAME.	Mean distance from the Sun in millions miles.	Mean diameter in miles.	Sidereal period in days.	Axial revolution in hours, minutes and seconds.	No. of Satellites.
Mercury	35.5	3,200	87.96	Uncertain	0
Venus	67.2	7,700	224.70	Uncertain	0
The Earth	92.9	7,925	365.25	23 56 4	1
Mars	139.8	4,300	686.95	24 37 22	2
Jupiter	475.5	85,150	4,232.58	9 55	5
Saturn	886.0	71,000	10,759.22	10 14 24	8
Uranus	1,781.9	31,900	30,686.82	Uncertain	4
Neptune	2,751.6	36,750	60,181.11	Uncertain	1

PLANTAGENET (plăn-tăj'e-net), the surname of a line of kings of England, who occupied the throne about 300 years. The name is thought to have originated from Geoffrey, count of Anjou, who wore a sprig of bloom (plante de genet) in his bonnet. He married Maude, a daughter of Henry I., and thus became the founder of the Plantagenet dynasty. The first representative on the throne was Henry II., who succeeded the Norman dynasty in 1154, and Richard III. was the last, being succeeded in 1405 by a representative of the house of Tudor. The different kings reigned as follows: Henry II. in 1154-1189; Richard I. in 1189-1199; John in 1199-1216; Henry III. in 1216-1272; Edward I. in 1272-1307; Edward II. in 1307-1327; Edward III. in 1327-1377; Richard II. in 1377-1399; Henry IV. in 1399-1413; Henry V. in 1413-1422; Henry VI. in 1422-1461; Edward IV. in 1461-1483; Edward V., a youth of thirteen, who died in the Tower in 1483; and Richard III. in 1483-1485. The Plantagenet family was divided into the Lancaster and York branches in 1400, the former being known as Red Rose and the latter as White Rose, and from their union in 1485 the house of Tudor originated. See **Roses, Wars of the**, and the articles treating of the above kings.

PLANTAIN (plăn'tăn), a genus of plants distributed abundantly in all parts of the world. They include about one hundred species, and are most abundant in the temperate regions. Many of them form common weeds. The greater plantain is widely distributed in the United States, and is a perennial with broad leaves, and cylindrical spikes

PLANTAIN.

bearing a large number of seeds of value as bird food. The spikes are gathered in many countries for their seeds, which are used for feeding caged birds. The roots and seeds are employed for treating wounds, and in a preparation for dysentery and diarrhœa.

PLANTAIN, a class of tropical plants allied to the banana, which are native to the East Indies. The plants consist of long, overlapping leaf-stalks, and bear a stem from four to twenty feet high. The leaves in several species grow to a length of six feet and a breadth of two feet, and the fruit is delicious and thoroughly wholesome. It grows in clusters weighing from forty to sixty pounds, each separate plantain of the cluster being about one inch in diameter and somewhat longer than a banana, and differing from the latter in not having purple spots on its stem. When roasted and eaten before maturity, it resembles the potato in taste, and the powdered dried fruit is quite similar to that of rice.

Many of the inhabitants of tropical regions subsist almost entirely on this fruit. Several species are particularly valuable for the fiber of the leaf-stalks. The abaca or Manila hemp is derived from a species of the banana and the plantain, and is one of the finest and strongest fibers known. It is used largely in making cloth and cordage. Medical properties are derived from the root, and its sap is useful in cholera.

PLANTAIN TREE.

PLANTS, the organized bodies endowed with vegetable life, which differ from animals in the important respect that they have neither feeling nor voluntary motion. The higher forms of plants have a root, stem, leaves, flowers, and fruit, though there are noted modifications of these, and in the lowest forms plant life may be reduced to a single cell. In the lower members of the vegetable and animal kingdoms it is quite difficult to distinguish a plant from an animal, as some of the mimosas that are sensitive to touch, but are classed as plants, while the sea-anemone is an animal, but it is firmly fixed to a particular place. A study of nature reveals to us that no abrupt transitions in forms of life occur; hence it is quite in line with nature's laws that the humbler members of the two kingdoms should be closely allied. It was long a debatable question whether sponges are animal or vegetable forms, though now they are considered compound animals, while many of the infusoria that once ranked as animals are now classed as plants.

Plant life generally subsists upon nourishment taken directly from the mineral kingdom, but there are notable exceptions in the parasitic plants that subsist on the juices of other plants, while animals take in nourishment principally through the intervention of plants or other animals. It is quite probable that the vegetable and animal kingdoms had their beginning with forms similar to those resembling both, and that through successive generations a great divergence resulted which finally brought forth forms unlike each other and vastly different from the original. That both kingdoms are interdependent may be observed in the different elements required for successful growth. Plants on the one hand require an atmosphere laden with carbonic acid, and in taking in this essential element they constantly throw off oxygen, while animals depend on constantly breathing oxygen and giving off carbonic acid. The atmospheric conditions are at present so fittingly adjusted to both forms of life that it would be quite impossible for either to exist for long periods of time without the other, and that these conditions were not always so is demonstrated by the beds of coal and other strata deposited in the Carboniferous Age. The cross-fertilization of many species of plants depends upon the work of birds and insects which carry the pollen from flower to flower. The life of both plants and animals depends upon light, moisture, temperature, and gravitation, but plants need also fertile soil. Chorophyll, the green coloring matter of plants, is due to sun light. The heat required to mature plants is dependent upon the character of the plants themselves, and they may not only be naturalized in different soils and climates under natural laws, but they may be artificially propagated and improved by the agency of man in countries far remote from their nativity. The law of gravitation causes the roots of plants to grow downward and the stems upward, but moisture largely modifies the growth and direction of the roots. As a general rule, the roots are equal to the branches in strength, since the action of the wind would otherwise cause the larger plants to fall. In a soil moist at the top the roots usually are near the surface, and in soil moistened only to a limited extent near the surface, they penetrate farther downward, though these are conditions governed quite largely by the nature of the different kinds of plants.

The organs of a plant are its root, stem, and leaves. The root is divided into smaller branches called rootlets. The stem is the part that grows upward, and bears the leaves and flowers. Leaves are either opposite or alternate, and constitute the foliage. Flowers, fruit, and seeds are the organs of reproduction. Plants are classed as annuals, biennials, or perennials, and in structure may be herbs, undershrubs, shrubs, or trees. Evergreen plants retain foliage the entire year, while deciduous plants shed their leaves at a certain season. The assimilative power and growth of plants is suspended in winter, and in this respect plant life resembles the hibernation of animals. The close of flowers and the folding of leaves at night in some plants suggest their sleep, and that this is an essential element has been successfully demonstrated by keeping an electric light constantly near a plant, thereby causing it to ultimately lose its vigorous growth. Plants, like animals, sooner or later die, but propagate their kind by the production of germs of new life. The number of known plants has been estimated by writers to include from 115,000 to 120,000 varieties.

PLASTER OF PARIS. See **Gypsum**.

PLATA, Rio de la, an extensive estuary of South America, situated between Argentina and Uruguay, and formed by the Uruguay and Parana rivers. Its breadth at

Buenos Ayres is twenty-nine miles and at its entrance into the Atlantic, between Maldonado and Cape San Antonio, 150 miles. It is 200 miles long, but in many places shallow water hampers navigation. An immense volume of water is carried through the estuary, since the drainage comes from an area of 1,250,000 square miles, and about one-fourth of the produce of South America is shipped through it. The principal cities and ports on its banks are Buenos Ayres and Montevideo. Juan Diaz de Solis first discovered it in 1515, but its present name was given to it by Sebastian Cabot. Floating islands are met with at some distance in the sea and at various places in the estuary.

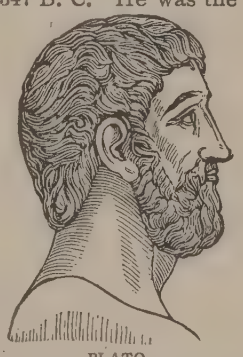
PLATÆA (plă-tē'a), a city of ancient Greece, about six miles south of Thebes, in Bœotia. It had a fine site at the foot of the northern slope of Mount Cithæron, and between it and Thebes the Asopus River formed a natural boundary. The city is thought to have been built by the Thebans, but there was continual strife between the two territories. In 519 B. C. the Platæans formed an alliance with Athens, and in 480 B. C. their city was destroyed by the Persians because they had assisted the Athenians in the battle of Marathon. The following year Aristides and Pausanius won a victory over the Persians at Platæa, in which the latter under Mardonius were completely scattered. It was besieged by an army of Spartans and Thebans in the Peloponnesian War, and after defending itself for two years was compelled to surrender in 427 B. C., when the city was destroyed and a large number of the people were slain. Those escaping found safety in Athens, but later returned to rebuild the city. Platæa had considerable importance as late as the 6th century A. D. Its ruins are near a village called Kokhla.

PLATING. See **Metallurgy**.

PLATINUM (plăt'ĭ-nŭm), a grayish-white metal found in the metallic state in rounded granules distributed through sandy deposits, and alloyed with the platinum metals. In the native state it occurs only in small, irregular grains from the size of a pinhead to that of a pigeon's egg, though there are instances in which the deposits have weighed as much as twenty pounds. However, the native platinum is not pure, and, besides containing traces of gold, iron, and copper, it is alloyed with several other metals which it resembles in certain properties, and which are called the platinum metals. These embrace iridium, paladium, rhodium, ruthenium, and osmium. It is very heavy, and is separated from sandy deposits by washing in a stream of water in the same manner that gold is separated from sand. Platinum is very malleable and ductile, has a brilliant luster, and, while the heaviest of ordinary metals, is least expanded by heat. Its high degree of infusibility and resistance to the action of chemical reagents makes it a valuable metal for vessels used in chemical laboratories, where evaporating dishes, crucibles, and capsules are used that are made chiefly of platinum. It enters largely into the stills used in evaporating sulphuric and nitric acids.

The alloys of platinum are not numerous, but with silver it forms a fusible white alloy, which, however, blackens by working and is attacked by nitric acid. It melts in the oxy-hydrogen flame and in the electric furnace; at a white heat it becomes soft and can be forged and welded like iron. The air does not affect it at any temperature. Its principal use is for apparatus in the chemical laboratory, and all this apparatus is made as thin as is consistent with strength, for the metal is quite rare and costly. Its property of resisting the effects of ordinary heat renders it of value in electrical supplies, and the platinotype process in photography, discovered within recent years, has opened a wider field and a larger demand. Platinum is found in various parts of the United States, but Trinity and Shasta counties in California have been the principal sources of supply. It occurs also in Oregon, Canada, Peru, Brazil, Colombia, the West Indies, and Borneo.

PLATO (plā'to), founder of a school of Greek philosophy, born in Athens in 429 B. C.; died there in 347 B. C. He was the founder of the first of the four great schools of philosophy, which was called the Academic school; while Aristotle founded the Peripatetic; Epicurus, the Epicurean; and Zeno, the Stoical. His early life is not clearly known, but it is certain that he was carefully educated from the fact that he was connected by his mother with Solon and by his father with Codrus, one of the kings of Athens. His education embraced gymnastics, music, and literature, and his first efforts were devoted to poetry, but when twenty years of age he became a student under Socrates, who influenced him by his teaching to embrace philosophy as a study. He was a favorite pupil of that great teacher, and appears to have been with him much of the time until his death, in 399 B. C. It is quite certain that Plato took part in at least three great battles, but made no serious attempts to enter political life, rather preferring to teach the doctrines of government than enter into official positions.



PLATO.

After the death of Socrates, he and other disciples of that teacher took refuge in Megara for some time, but later he made an

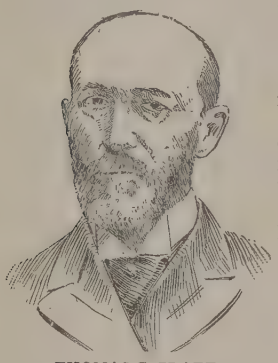
extensive tour through Lower Italy, Sicily, Cyrene, Egypt, and Asia Minor for the purpose of improving his mind. Other journeys are attributed to him by various writers, but it is not certain that accounts of them are more than traditional. These journeys include one to Sicily, in which he is credited with coming into relationship with the younger Dionysius; and one to Palestine, Persia, and Babylon, where he is said to have studied the wisdom and philosophy of the East. He returned to Athens about 388 B. C., and there began his teaching in the Academy, a beautiful park in the western part of the city, so named from Academus. The profound topics which he treated were enlivened by wit, fancy, humor, and picturesque illustrations. His style was considered so perfect that an ancient said of him, "If Jupiter had spoken, he would have spoken like Plato." The Academic Gardens were thronged by the populace of Athens to listen to the speeches of the master. Though the Athenian women were excluded from the intellectual groves, yet they shared in the universal eagerness, and, disguised in male attire, stole in to hear the philosophy of Plato. His instruction was given without remuneration, and his support seems to have come almost entirely from the inheritance received from the estate of his parents. Among the many noted disciples of Plato was Aristotle.

Plato made use of the methods of teaching employed by Socrates, and like him held that the end of philosophic teaching is to lead the mind of the inquirer to discover truth, rather than seek to impart it by making statements without giving evidence, or by employing positive assertions. This inductive method was so formed that general definitions were reached by systematic conversational forms. The writings of Plato are classed as "Dialogues" and "Letters," though the latter are not generally admitted as genuine. The "Dialogues" are generally accepted as coming from Plato, but the exact order in which they appeared has not been established. Schleiermacher and Hermann have prepared chronological sections, but these two scholars differ somewhat in their constructive arrangement. According to the former there are three sections of the "Dialogues." The works of most importance in the first division include "Phœdrus;" "Parmenides;" "Protagoras;" "Laches;" "Lysias;" "Charmides," and "Euthyphron;" in the second, "Sophistes;" "Theætetus;" "Politicus;" "Phædo;" "Philebus;" "Meno;" "Gorgias;" "Euthydemus;" "Cratylus," and "Symposium;" and in the third, the "Republic Timæus;" the "Laws," and "Critias." The "Dialogues" of Plato contain his philosophical teaching, but aside from this they are of great literary value and embody the highest perfection attained in Greek prose. The author idealizes Socrates as one of the speakers, and he is made to represent to the student the philosophy of the early Greeks and the systems taught by the different teachers. This plan is followed not only for its historical value, but in it Plato analyzes the opinions of the different philosophers, thus bringing his student in contact both with historical and philosophic themes.

As a whole, the philosophy of Plato comprises a grand effort of the mind to compass the problem of life. He is the first to divide philosophy into the three branches of physics, ethics, and dialectics and his disciple, Xenocrates, was the first to apply these names. The "Phædo" treats mainly of the doctrine of the immortality of the soul, and Plato is perhaps best known by this doctrine. He believed in one eternal God, without whose aid no man can obtain wisdom or virtue, and in a present as well as a future existence. Since he held that the soul has an existence before the body, he thought that all earthly knowledge is but the recollection of ideas gained by the soul in its disembodied state, and, as the body is only a hindrance to perfect communion with the eternal essence, it follows that death is to be desired rather than feared. These ideas he understood to be the perfect patterns of intelligence and virtue that were common to the soul in its existence before the body, and, since they existed as perfect types of the original intelligence from all eternity, they cannot be perceived by human intelligence. After leading his disciples to discover the realm of ideas, he induced them to follow him in surveying it throughout. The highest forms he regarded as justice, beauty, and virtue, and the dominant principle of the whole realm is the idea of the good. He harmonized intelligence with goodness, and this contitutes the aim of his philosophy.

The "Republic" is one of his best known writings, and is a work on public education, in which he also presents the elements of an ideal commonwealth. Both his system of education and that of a republic are ideal, and in both the individual and the family are sacrificed to the state. Education is to fit every individual to become a part of the state, and receive not only an intellectual and artistic culture, but to acquire physical perfection by training in gymnastics. The "Laws" is the work of his old age, and in it much of the radical element expressed in the "Republic" is qualified. He renounces the distinction of social caste, and gives a practical and minute application of education to all children without distinction of classes. The end of education he sets forth in this excellent definition: "A good education is that which gives to the body and to the soul all the beauty and all the perfection of which they are capable." While the "Republic" is a work of pure imagination, the "Laws" forms a commentary on the actual state of practice. In both we find what was nearest the soul of Plato—the constant search for a higher morality.

PLATT, Thomas Collier, public man, born in Oswego, New York, July 15, 1833. He studied at Yale University for some time, but owing to ill health discontinued work there in 1853. Later he resumed study at Yale, and received a degree from that institution in 1876. Soon after he became president of a national bank in Tioga, New York, and engaged in large lumbering enterprises in Michigan. He was elected to congress as a republican in 1872, was reëlected in 1874, and in 1881 he succeeded Francis Kernan as United States senator. In the same year both he and Senator Conkling disagreed with President Garfield in regard to federal appointments and resigned, and both failed of reëlection. In 1880 he became president of the United States Express Company, and in 1897 was again elected to the United States senate.


THOMAS C. PLATT.

PLATT-DEUTSCH (plăt-doich'), or **Platt-German**, a German dialect spoken in North Germany, principally in the lowlands from Russian Poland to the boundary of Holland. It is popularly called Low Dutch by English-speaking people, and is a distinct language that came down to the present time from the Old Saxon. The Flemish and Dutch languages are classed with the Low German, but since they have a distinct literature and are associated with different political governments they are usually regarded distinct languages. They include a number of different dialects, but all of them show a remarkable agreement with the Dutch, German, Flemish, English, and Scandinavian in their system of consonants. Formerly the Low German was spoken in a large region south of the North Sea, particularly before the Reformation, but since then the High German has steadily superseded it as the modern classical language. The High German is now taught in the schools, and the Low German is spoken in the home of the peasants, but the former is gradually gaining territory. There is a literature of much interest in the Low German, and within recent years it has been enlarged and popularized by Fritz Reuter and Klaus Groth.

PLATTE (plăt), a river formed at North Platte, Nebraska, by the confluence of the North Platte and South Platte rivers. After a course of about 400 miles toward the east it joins the Missouri at Plattsmouth. Both the North and South Platte rivers rise in the Rocky Mountains, the former having a length of about 800 miles and the latter about 500 miles. The channels of these rivers are wide and sandy, and during the melting of the snow on the mountains, in May and June, they are well filled with rapidly flowing and sand-colored water, but in the other seasons of the year extensive sandbars appear. Neither of these rivers is navigable. The entire basin of the Platte includes about 300,000 square miles. Its valley is broad and fertile in the eastern part, but in the foothills and mountains are precipitous bluffs on either side. They are chiefly of a mixed limestone and sandstone formation.

PLATTSBURG, a town of Clinton county, New York, about 145 miles north of Albany. It has convenient railroad connections, good schools, and numerous municipal facilities. It is the seat of a state normal school and of the Roman Catholic Summer School of America. Among the manufactures are flour, wagons, machinery, canned products, and utensils. The surrounding country is agricultural, and contains deposits of iron. Population, 1900, 8,434.

PLATTSMOUTH, a city in Nebraska, county seat of Cass county, on the Missouri River, nineteen miles south of Omaha. It is situated immediately south of the Platte River, has well platted and paved streets, and is conveniently connected with Omaha and other cities by a number of railways. There is a large trade in cattle, grain, lumber, and merchandise. It has extensive railroad machine shops. Among the manufactures are carriages and wagons, canned fruits, tobacco products, flour, machinery, and earthenware. The city has excellent public school buildings, numerous churches, good sewerage and lighting, and a courthouse that cost $50,000. Population, 1900, 4,964.

PLAUEN (plŏw'en), a manufacturing city of Germany, on the Elster River, sixty-five miles south of Leipsic. It is situated in a beautiful and fertile valley, and has railroad conveniences. Its manufactures include muslin, cotton goods, cambric, leather, embroidered goods, paper, and machinery. It has a beautiful palace, a gymnasium, numerous educational and benevolent institutions, and is beautified by a number of excellent gardens and parks. The municipal facilities include telephones, electric lighting, and pavements. Population, 50,110.

PLAUTUS (plaw'tus), **Titus Maccius**, noted comic writer and dramatist of Rome, born at Sarsina in Umbria, about 254 B. C.; died in 184. He probably received his education at Rome, where he studied the Latin language and acquired proficiency in Greek literature. It is thought that he became connected with a dramatic company at Rome, and that he later engaged in foreign trade, but after failing in the latter he returned to Rome and supported himself in turning a handmill for a baker. His first three plays were composed a short time

before the beginning of the Second Punic War, when he was about thirty years of age, and the popular reception accorded to these productions caused him to engage permanently in literary work. After 224 B. C. his time was devoted to literature, and he exhibited a wonderful fertility of mind until his death.

Writers credit Plautus with the authorship of 130 plays, but only twenty of them are extant. These plays portray faithfully the life of the middle and lower classes of Rome, and the humor running through them caused them to remain popular for many centuries. They were played extensively to the time of Emperor Diocletian. Many of his plots and scenes were drawn from the Grecian writers, but he supplied an original language that was commended by Cicero, Varro, and St. Jerome. Many of the English writers have drawn inspiration from Plautus, among them Shakespeare, Addison, Dryden, and Leslie, and a number of his works have been translated into many of the modern languages. The writings of Plautus extant include "Amphitryo;" "Asinaria;" "Aulularia;" "Captivi;" "Curculio;" "Casina;" "Cistellaria;" "Epidicus;" "Bacchides;" "Mostellaria;" "Menæchmi;" "Miles;" "Mercator;" "Pseudolus;" "Pœnulus;" "Persa;" "Rudens;" "Stichus;" "Trinummus," and "Truculentus." These titles have been arranged from a treatise published by Varro, who added another work, entitled "Vidularia."

PLAYFAIR, Lord Lyon, chemist and statesman, born in Meerut, India, May 21, 1819; died in London, England, May 29, 1888. He graduated from St. Andrews University, Scotland, studied chemistry at the Andersonian University, Glasgow, and returned to India to improve his health. In 1843 he became professor of chemistry at the Manchester Royal Institution, and later was appointed by Sir Robert Peel on the sanitary commission to examine the chief British cities. He had charge of the department of juries at the exhibition of 1851, receiving as a reward a companionship of the Bath, and in 1857 became president of the Chemical Society of London. The following year he was elected to the chair of chemistry in the University of Edinburgh, and in 1868 entered parliament as a liberal from the Scotch University, holding his seat for seventeen years. In 1873 he was made postmaster-general, and after the election of 1880 served three years as chairman of ways and means. He was raised to the peerage as Baron Playfair of St. Andrews, and in 1892 was made a lord-in-waiting. Lord Playfair wrote a number of works on chemistry and educational subjects, and edited Liebig's "Chemistry in Its Application to Agriculture and Physiology."

PLAYS. See **Drama.**

PLEASONTON (plĕz'ŏn-tŏn), **Alfred**, soldier, born in the District of Columbia in 1824; died at Washington, D. C., Feb. 17, 1897. He graduated at the West Point Military Academy in 1844, served with distinction under General Taylor in the Mexican War, and for bravery at the battles of Palo Alto and Resaca de la Palma was breveted first-lieutenant. He served in the regular army until the beginning of the Civil War, and in 1862 was commissioned a major of cavalry. When General Lee invaded Maryland, Pleasonton commanded the cavalry that followed his rear. Later he took part in engagements at Boonsboro, South Mountain, Antietam, Fredericksburg, and Chancellorsville. At the latter he successfully checked the advance of Stonewall Jackson, thereby saving Hooker's army. Soon after he became major-general and took a leading part in the campaign before Gettysburg, for which he was made colonel in the regular army. In 1864 he was transferred to Missouri, where he distinguished himself by compelling the Confederates under General Price to retreat from the state. He became major-general in the regular army in 1865, but resigned his commission in 1868. President Grant appointed him collector of internal revenue in the latter year, and later he became president of the Cincinnati and Terre Haute railroad. He was placed on the retired army list in 1888 with the rank of colonel.

PLEBEIANS (plē-bē'y*a*nz), or **Plebs**, one of the two great classes into which the Roman people were divided, the other being the patricians. The latter class enjoyed all the offices of the government and the privileges in connection with governing the affairs of the nation, while the plebeians were not only denied these, but were forbidden to intermarry. Though the plebeians bore the brunt of fighting, they were denied the right of using the spoils of war. The contest between the two classes for the enjoyment of equal civil rights constitutes a large part of the civil history of Rome. In 268 B. C. the Hortensian law was finally established, under which the two hostile classes were recognized as one general body of Roman citizens with equal rights. This law provided practical equality in the rights of property. With representation of these classes in the legislative branch of the government, the civil rights of both remained practically equal, and later all traces of former distinctions disappeared.

PLEIADES (plē'yȧ-dēz), a beautiful cluster of stars in the constellation Taurus, which is sometimes called the Seven Sisters. It contains a large number of stars, six of which are visible to the naked eye. In Greek legends the Pleiades were regarded the seven daughters of Atlas and Plione, and bore the names Electra, Taygete, Maia, Celaeno, Alcyone, Merope, and Sterope. Grecian mythology accounts for only six of these stars being visible to the naked eye by asserting that Electra left her place that she might behold the ruin of Troy, which city was founded by her son, Dardanus. Later

they all committed suicide out of grief for the death of their sister, and were placed by Zeus as stars on the shoulder of Taurus. These stars were anciently of special interest to the sailors of the Mediterranean, since they rise in Italy about the beginning of May and set about the beginning of November, a period covered also by the navigation of the Mediterranean in the prosperity of Greece.

PLINY THE ELDER (plĭn'ĭ), eminent writer of Italy, born at Comum, now called Como, in 23 A. D.; died in the year 79. He was the uncle of Pliny the Younger, and at an early age came to Rome for educational advantages. The wealth and high standing of the family made it possible for him to acquire the most liberal training available in his time. At the age of twenty-three he became a commander of a troop of cavalry in the army stationed in Germany, and served for some years under L. Pomponius Secundus, of whom he later wrote a biography. In 52 he returned to Rome and studied law. After practicing the legal profession for a short time, he returned to his native town to devote his attention to literary research. Later he was appointed governor of Spain by Nero, where he remained until 71. Soon after he returned to Rome and again pursued literary work. In 73 he adopted his nephew, Pliny the Younger, whose education he directed. He is the author of a large number of works, but only one, his "Natural History," has come down to us. This work was published in 77, and consists of thirty-seven volumes, covering the whole range of the scientific knowledge of his time. He became commander of the Roman fleet, and in 79 he was stationed off Misenum, when the great eruption of Mount Vesuvius buried Pompeii and Herculaneum. He was eager to witness this remarkable phenomenon at close range, and hastened toward the seat of disturbance, but was suffocated in the vapors caused by the eruption.

PLINY THE YOUNGER, distinguished writer of Italy, nephew of the former, born at Comum, now Como, in 61 A. D.; died in 115. He was the son of C. Cæcilius. After the death of his father, he was adopted by his uncle, from whom he inherited a valuable estate and manuscripts. He was a man of highly cultured talents, possessed great devotion for literature, and, like his uncle, was noted for industry and perseverance. His education was completed under the famous Quintilian, and he began to plead in the quorum when only eighteen years of age. In the year 100 he was chosen consul, was made governor of Pontica in 103, and after two years' service there became curator of the banks and channel of the Tiber. His literary fame rests largely upon his panegyrics on Emperor Trajan and his charming letters. The former is known as the "Eulogium" and the latter as the "Epistles," but he is the author of many other works, though the two mentioned are the only ones extant. He was an associate of Tacitus, the orator and historian. The two scanned and criticized each other's manuscripts, and by their intimacy became so linked to each other that they were jointly remembered in people's wills.

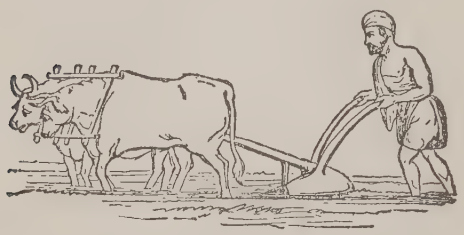
PLOVER (plŭv'ẽr), a class of birds frequenting the shore and inland waters of America and Eurasia. There are many well

COMMON PLOVER.

known species, differing in size and color. The common plover has long wings, the points usually projecting beyond the tail. It is speckled above, and in the breeding season black below. The gray plover is a native of the northern hemisphere, and the speckled plover is found largely in Europe, where it is known as the golden plover, a name applied because of its colorings of yellow above. The American golden plover has yellowish feathers above and smoky-gray below. Other American varieties include the green plover, kildeer plover, and the stilt plover. Birds classed with the plovers are found in all parts of the world. They fly with rapidity and run swiftly, some species pretending to be injured, with the design of protecting their nest and young from an enemy. The field plover is a notable example of this class, and is found in many regions of America in cultivated fields, where it feeds on seeds, insects, and berries. Most of the plovers molt twice a year, and the males and females have a very similar appearance. The nests of all species are built on the ground. Some species are regarded of value for their flesh and their eggs are eaten in many countries. The golden plover of America is migratory, passing to the higher latitudes in the spring.

PLOW, an implement used by farmers and others for turning over, furrowing, or breaking up the soil. It is drawn by animal or steam power, and those designed for ordinary field work are constructed with the view of cutting off longitudinal slices of earth and turning them over so an entirely new surface becomes exposed to the action of the air. Plows constructed on this plan usually have a cutter that cuts off the weeds

and stubble so all substances above the surface may be wholly turned under, thus providing the soil with fertilizing substances and exposing a surface well adapted to cultivation and for receiving the seed of a crop

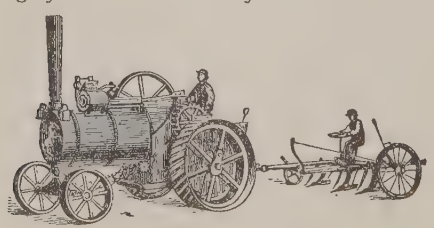


SYRIAN PLOWING.

to be sown or planted. Plows are mentioned very early in history, though they were formerly of inferior construction, and people little advanced in industrial arts still use illy constructed instruments either wholly or partly of wood.

The plows of modern manufacture are almost entirely of iron and steel. The different parts of an ordinary plow include a share for slicing the earth at the bottom of the furrow; a landside that presses against the land to aid in guiding the plow; a standard or sheath connecting the share and moldboard with the beam; a beam by which the plow is drawn; handles for the plowman to steady and guide the implement; and usually a colter for cutting the furrow slice from the land. There are special plows for different purposes that are known as drain plows, drill plows, subsoil plows, and mold plows. A plow with a double moldboard is used for earthing up potatoes and peanuts and a turn-wrest plow is so arranged that the entire field may be turned in the same direction, the moldboard being turned to either side for that purpose. A plow of this character is quite serviceable in hilly regions, where it is often desired to turn the soil toward the sloping direction, and in plowing gardens to avoid the inconvenience of a number of furrows.

Plows of American manufacture have gone largely into use in many countries. They



STEAM PLOW.

are manufactured of different materials so they may work successfully in different kinds of soil. It is essential that the portions passing through the ground be made of a material that easily cleans itself, or scours. A soil containing much sand is turned easily with an inferior share and moldboard, but the heavier clay and gumbo soils require metal of extra quality, which is hardened by a process requiring considerable care. Much of the plowing on the larger farms and plantations is now done with implements mounted on wheels, thus avoiding a large part of the friction and enabling the plowman to ride. These plows are drawn by three or four horses, and have either one large plow or two or more smaller ones. Steam plowing is of modern invention, and is used only on the farms of the largest size. The plow proper consists of one or two sets of plows attached to an iron frame. There are from two to five separate plows in each set, and these are mounted on two wheels. In some kinds a steam engine is stationed on one side of the field, and the plow is drawn back and forth by means of a cable passing through a stationary capstan at the other side. Where this is the case, the plows are in two sets, being adjusted so they point in different directions, and are raised or lowered alternately so those on the different sides of the wheels plow only when drawn forward, the others being raised above the surface. A plan suggested is to have a cable pass entirely around the field, which is put in motion by a stationary engine, and the attached plow passes around the field, continually cutting farther inward as the cable is moved from time to time. However, it has not proven practicable. A steam plow of the kind in successful use is shown in the illustration. Plows of this character are employed on the large farms of Minnesota, the Dakotas, and other regions of the United States, and have been successfully introduced in many countries where the soil is comparatively level and free from stones. The engines used in plowing render services in drawing wagons and driving saws, pumps, mills, and threshing machines at seasons of the year when they are not employed in plowing.

PLUM, a class of fruit trees belonging to the same genus as the apricot, almond, peach, and cherry, and cultivated in all countries. Many different species have been described. They range from the small varieties of cold regions to the large and luscious kinds produced extensively in the temperate and tropical zones. Plums of various kinds are native to many different countries, and they were found extensively distributed in America at the time of its discovery, though since then other species have been acclimated, while the native varieties have been improved more or less by propagation. Among the common varieties are the Chickasaw, beach, damson, Damascus, black-thorn, green gage, Cashmere, cherry, and St. Julien. These differ greatly in size, taste, color, and form, and are alike valuable for different purposes. Prunes are made by drying certain kinds of plums; others are eaten fresh, preserved, or used in

making syrup, vinegar, and alcohol. Plum jellies, jams, and syrups are delicious. Plum wine is valuable for coloring, purifying, fining, and mellowing spirits and is made

PLUM.

from prunes. The plum tree yields a hard and fine-grained wood, which is well adapted for carvings.

PLUMB, **Preston B.**, statesman, born in Delaware county, Ohio, Oct. 12, 1837; died Dec. 20, 1891. He studied in the common schools of Ohio and settled in Kansas in 1856. In 1861 he was admitted to the bar, and the following year became a member of the state legislature. In the same year he entered the United States army, and by valued services rose to the rank of colonel. Soon after the war he became a member of the Kansas house of representatives, of which he was speaker in 1867, and in 1877 was chosen a member of the United States senate, where he was influential as a republican until his death.

PLUTARCH (plu'tark), noted biographer and moralist, born in Chæronea, Greece, about 46 A. D.; died about 117. The dates of his birth and death are uncertain, and little of his personal history is known, but it is certain that he was a contemporary of Tacitus and the Plinys. It is thought that he studied at Athens in 66 A. D., since he speaks in his writings of Ammonius as his teacher, and of Nero invading that country with a Roman army while he was still a student. Later he removed to Rome, where he learned the Latin language and came in contact with many noted Roman scholars and statesmen. His lectures on philosophy attracted the attention of large audiences, both in Rome and other cities of Italy, and in the latter part of his life he resided at Chæronea, where he filled the office of magistrate and was a priest to Apollo. His long life was associated with the historic reign of Nero and with that of Trajan.

The fame of Plutarch rests upon his excellent work, entitled "Parallel Lives of Greeks and Romans." This work is the most celebrated of ancient biographies, and treats of forty-four different distinguished men. The biographies are arranged in pairs as follows:

1. Eumenes and Sertorious.
2. Cimon and Lucullus.
3. Lysander and Sulla.
4. Demosthenes and Cicero.
5. Agis and Cleomenes.
6. Pelopidas and Marcellus.
7. Phocion and Cato the Younger.
8. Aristides and Cato the Elder.
9. Pericles and Fabius Maximus.
10. Nicias and Crassus.
11. Dion and Brutus.
12. Timoleon and Æmilius Paulus.
13. Philopœmen and Titus Flaminius.
14. Themistocles and Camillus.
15. Alexander and Cæsar.
16. Agesilaus and Pompey.
17. Pyrrhus and Marius.
18. Solon and Valerius Publicola.
19. Demetrius and Antonius.
20. Alcibiades and Coriolanus.
21. Theseus and Romulus.
22. Lycurgus and Numa.

It will be noticed that the first mentioned in each of the pairs is a Grecian. Besides these biographies, Plutarch wrote the lives of Artaxerxes Mnemon, Galba, Aratus, Otho, Tiberius, and Caius Gracchus. It is certain that he was the most distinguished writer of biographies of ancient times, and few modern writers have equaled him. He is best known from the character of his writings, which show him to have regarded of most worth those virtues that cause men to become celebrated as soldiers and statesmen, or lead them to the ranks of worthy citizens, holding these in higher esteem than artists and poets. It is said that Napoleon was profoundly interested in reading Plutarch, and it is no doubt true that his life was influenced to a considerable extent by the biographies of that writer.

PLUTO, in Greek legend, the surname of Hades, the third son of Cronos and Rhea, and brother of Zeus and Poseidon. The Greeks regarded him ruler of the infernal regions, which were afterward known as Hades, being so named from Pluto. In the time of Homer, Hades was the name of a person instead of a place, as it was afterward applied, and the people of his time had no conception of two distinct realms for the departed, but both the good and bad were thought to live together. In later history Hades became the name of a place, and it was thought to consist of two distinct regions, the realm of the good being known as Elysium and that of the wicked as Tartarus. This modification of the conception of the realm of the departed also modified the station assigned Pluto, who became the ruler of Tartarus, but he was regarded as the guardian of treasures below the earth, and it was thought that he caused an abundance of fruit to spring from the soil. The name Pluto is from plutein, meaning to be rich. In later times the Romans adopted the Grecian notions with regard to a future state, and began to worship Pluto in place of Dis Pater, a name derived by them from dives, meaning rich.

PLUTUS (plū'tŭs), the Grecian god of riches, son of Demeter and a mortal called Jasion. It was the common supposition that Plutus bestowed his gifts upon the good. He was made blind by Zeus that all should receive the benefits of his riches without dis-

crimination. He is represented in statuary as coming slowly to men, but when he departs he is borne away swiftly by wings. His dwelling-place was under the surface of the earth. Aristophanes made Plutus the subject of a comedy.

PLYMOUTH (plĭm'ŭth), a port of entry of Massachusetts, county seat of Plymouth county, thirty-seven miles southeast of Boston. It is conveniently situated on Plymouth Bay, and its site is the famous landing place of the Pilgrim Fathers, who came there on Dec. 21, 1620. There are convenient railroad facilities, a good harbor, and the city is supplied with electric lighting, pavements, waterworks, and a library. Among the noted buildings is Pilgrim Hall, a memorial hall erected in 1824 by the Pilgrim Society in memory of the Pilgrims. It was remodeled in 1880. This structure contains a fine collection of paintings relative to the history of the Pilgrims, the most noted being "Landing of the Pilgrims;" "Embarkation of the Pilgrims," and "Embarkation from Plymouth, England." It has a number of excellent portraits and a large collection of articles and curiosities brought over in the Mayflower. Another structure of prominence is the National Monument to the forefathers, erected in 1859, but not completed and dedicated until in 1889. It is built of granite, is eighty-one feet high, and is one of the finest works of art in America. The city has manufactures of cotton and woolen goods, furniture, hardware, cordage, machinery, and metalware. Population, 1900, 9,592.

PLYMOUTH, a town of Luzerne county, Pennsylvania, on the Susquehanna River. It has good railroad facilities, several fine school buildings, and is surrounded by a productive mining region. The surrounding country produces cereals and fruits. It has modern municipal facilities and a growing trade. Population, 1900, 13,649.

PLYMOUTH, a seaport of England, between the estuaries of the Tamar and Plim rivers, on the north shore of Plymouth Sound, 200 miles southwest of London. The city is well defended by land and sea, has an excellent harbor, and is improved by modern municipal facilities. It has a large number of charitable and educational institutions, many splendid churches, and fine business blocks. St. Andrew's Church dates from 1490, and Charles Church, dedicated to Charles the Martyr, was built in 1646. The city has numerous public parks, several boulevards, and an excellent public library. It has extensive railroad connections with inland points, and its commercial trade extends to all foreign countries, but it is particularly large with the West Indies, South Africa, and Mediterranean ports. At the time of the Norman conquest Plymouth was a fishing village, when it was known as Sutton, but at the time of Edward the Black Prince it rose into prominence, and was an important factor in the history of England for many years. From there the Pilgrim Fathers sailed for America in the Mayflower in 1620. Population, 99,135.

PLYMOUTH ROCK, a granite bowlder on Massachusetts Bay, celebrated because of the landing of the Pilgrim Fathers on Dec. 21, 1620. It is supposed that Mary Chilton and John Alden were the first Europeans to set foot upon the rock. A large piece was broken from the rock in the early period of the colony, and this was taken by twenty yoke of oxen to the center of the city of Plymouth, where it was surrounded by an iron railing, but it was returned to its original position at Hedges' Wharf in 1880.

PLYMOUTH SOUND, an inlet from the Atlantic Ocean, on the southern coast of Cornwall, England. It receives the waters from the Tamar and Plim rivers, and on its north shore is the city of Plymouth. An important breakwater was constructed in 1812 to protect the harbor, and it has since been improved at various times. The amount of money expended on this breakwater is about $8,250,000, and it is one of the most noted of Europe. It consists of a substantial mole of stones, and affords ample protection for the anchorage of vessels within the inclosure formed by its extension of about one mile. Plymouth Sound possesses much natural beauty, and has been the seat of many historic and decisive naval engagements. The Eddystone lighthouse is situated about fourteen miles southwest of the breakwater.

PNEUMATIC DISPATCH (nū-măt'ĭk), a system of transmitting written dispatches through narrow tubes by the agency of air pressure. Attention was first called to the utility of rapid transmission for short distances through the agency of air by Denis Papin in 1667, when he presented a paper to the Royal Society in London, entitled "Double Pneumatic Pumps." However, the system was not practically applied until about the middle of the 19th century, but at present it is utilized in many cities of America and Eurasia. In general the system consists of having two tubes of cast iron between the desired stations, forming a circuit in which the air is kept constantly circulating. A compressor forces air into the tubes at a pressure depending upon the length and size of the system. There are provisions that enable placing the matters to be carried into a receptacle within the tube without a waste of air pressure, and it is carried to the other end and deposited into the receiving tray. The time of transit is usually 1,000 yards per minute, but this varies according to the pressure and size of the tube. The pneumatic dispatch line between the New York post office and the Grand Central Palace office is three and one-fourth miles long and is one of the largest in America. In Berlin, Germany, the lines have

forty-five stations and include about thirty-five miles of tubes, in which the dispatch speed is about twenty miles per hour. Many different systems are now in successful use, in some of which the carriage is by suction and others carry freight and passengers.

PNEUMATIC TIRES. See **Wheel.**

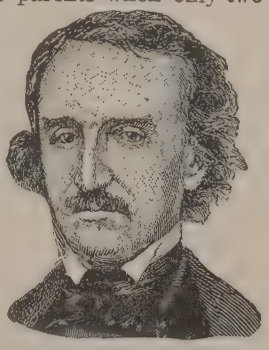
PO, an important river of Europe, the largest in Italy. It rises in the Alps, near the boundary line of France, at an altitude of 6,000 feet, and drains the large plain of northern Italy lying between the Alps and the Appenines. The entire length is 417 miles, and its basin is 27,750 square miles. It enters the Adriatic Sea by a large delta, extending inland above Ferrara, a distance of sixty miles, and its width at the sea is about fifty-eight miles. The Po is remarkable for its width and the large volume of water carried from the mountains to the sea. Its extensive navigation facilities make it an important route. Turin is the most important city on its banks, but there are others that enjoy a large commercial trade.

POCAHONTAS (po-ka-hŏn'tas), daughter of Powhatan, a distinguished Indian chief, born in 1595; died off Gravesend, England, in March, 1617. Her early life was spent among the Indians in Virginia. In 1607 she became connected with the early history of America by saving the life of Capt. John Smith, and otherwise showed friendship for the English colonists. Smith had been taken prisoner while making an exploring expedition and was about to be executed, when she prevailed upon her father to spare his life, and two years later she informed the colonists of an intended Indian raid. In 1612 she was held as a hostage by an English force, and the following year became converted to Christianity, being christened Rebecca. She married John Rolfe, an Englishman, in 1614, and two years later accompanied him to England. King James received her at his court as Lady Rebecca. She was an object of much interest during her stay of six months, and died on the ship returning to Virginia, off Gravesend. She was the mother of a son, who received an education in London, and from him a number of illustrious families of Virginia descended.

POCAHONTAS.

POCATELLO, a city of Idaho, county seat of Bannock county, in the southeastern part of the state. It is important as a railroad junction, and has a growing trade in live-stock and merchandise. Among the manufactures are earthenware, clothing, cigars, and machinery. It has several fine school and church buildings. The surrounding country is devoted to mining and stock-raising. Population, 1900, 4,046.

POE, Edgar Allan, noted poet, born in Boston, Mass., Feb. 19, 1809; died Oct. 7, 1849. He lost his parents when only two years of age, and was adopted by John Allan, a wealthy merchant of Richmond, Virginia. His father was a man of good family and his mother a professional actress. He attended school in England from 1816 till 1821, and at the age of seventeen entered the University of Virginia, at Charlottesville, where he showed distinguished ability as a student, but left the university at the end of one session principally because he had a great passion for card-playing and contracted many debts. This conduct caused a quarrel with Mr. Allan, and Poe sailed for Europe to aid the Greeks in their struggle for independence. He returned to Richmond in 1829, and after remaining at home a year, entered the West Point Military Academy as a cadet. His ambitions at that time were wholly for literature, thus causing him to neglect his duties and disobey orders until he was finally dismissed from the United States service.



EDGAR A. POE.

From West Point he again returned to his home, but in the meantime Mr. Allan had become a widower and married a second time. The relations between Poe and Mrs. Allan were extremely unpleasant, and he was at home only at intervals, and at the death of Mr. Allan in 1834 the estate was left to his young son, while Poe was not mentioned in the will. Poe was now thrown upon his own resources for a livelihood, and became engaged wholly in literary work, contributing to various newspapers and magazines in Richmond, New York, and Philadelphia. His first regular contributions were made to the "Southern Literary Messenger," in Richmond, which he edited for some time, but in 1837 he removed to New York and had charge of editorial work on the "Quarterly Review." The following year he edited "Graham's Magazine" in Philadelphia, and remained its principal writer for four years. The entire literary career of Poe embraces fifteen years, most of which time he was connected with periodicals in some manner, but at intervals wrote various criticisms and excellent poetry. His first remarkable success was achieved in 1833, when he secured two prizes of $100 each by

contributing the best prose composition and the best poem under a competitive test to a Baltimore magazine. The best known poem from his pen is "The Raven," which he published in 1845.

Writers have differed widely as to the worth of Poe from a moral standpoint, but all have credited him with an unrivaled power in making friends and with marked ability as a writer of intricate sentences and beautiful verses. Perhaps, it is true that his tendency to indulge in gambling and strong drink largely affected his power as a writer. It rendered him sensitive and melancholy, and caused him to waste to a great extent his genius and throw away his life. However, the force with which he appeals to universal sentiments has never been surpassed, and his knowledge of the mechanism of composition is truly wonderful. Though his writings are limited, they will endure as representative compositions of the last century. He married Virginia Clemm, his cousin, in 1832, but she died childless in 1848, and Poe died soon after in Boston from the effect of excessive indulgences. His principal writings include "Hans Pfaal;" "House of Usher;" "Arthur Gordon Pym;" "Descent into the Maelstrom;" "The Raven;" "Murders in the Rue Morgue;" "Annabel Lee," and "The Bells." He also published a compendium, entitled "Philosophy of Composition."

POE (pō), **Orlando Metcalfe**, engineer, born in Navarre, Ohio, March 7, 1832. He graduated at the West Point Military Academy in 1856, and until 1861 was engaged with an engineer corps in surveying in the vicinity of the Great Lakes. In the early part of the Civil War he served on the staff of General McClellan, was appointed brigadier-general in 1862, and afterward served as chief engineer of the army under Sherman that invaded Georgia and later marched to the sea. Subsequent to the war he served on the United States Lighthouse Board, and in 1870-73 built the lighthouse in Lake Huron situated on Spectacle Reef. He was again a member of the lighthouse board in 1874-84, and served on other boards having charge of harbor and river improvements in the vicinity of the Great Lakes. Poe held the rank of colonel of engineers and was major-general in the regular army.

POERIO (po-ā′re-o), **Carlo**, statesman and patriot, born in Naples, Italy, Dec. 10, 1803; died at Florence, April 28, 1867. He descended from a family distinguished for its devotion to liberty. When his father was exiled after the Revolution of 1820, Carlo accompanied him to Styria. His education was carefully directed by his father, and after studying law at Naples, he became an advocate of recognized ability. In 1828 he was identified with the liberals in Naples, was imprisoned for supporting a conspiracy in 1838, and again for aggressive movements for independence in 1847. He was chosen a leader of the Revolution of 1848, and after the adoption of a constitution held a number of important offices and was selected as deputy to the parliament. The government accused him of being a member of the Italian Unity, which had for its purpose the support of Garibaldi and the proclamation of a republic, and in 1849 he was condemned to imprisonment for twenty years at hard labor. The treatment accorded him and a number of others attracted the attention of many prominent statesmen of Europe, among them Gladstone, who wrote the famous "Two Letters to Lord Aberdeen" in 1851. Fearing a popular rising, Emperor Ferdinand II. concluded to liberate the prisoners by transporting them to South America. They sailed from Italy in the early part of 1869, and at Cadiz, Spain, they were placed on board an American vessel, but when they reached Cork, Ireland, the captain was induced to permit them to land. Poerio proceeded first to London, but later returned to Turin, where he was received with enthusiasm, and later was elected to parliament as deputy from two colleges in Tuscany. He became vice-president of the Italian chamber of deputies in 1861, and took a leading part in national affairs.

POETRY, one of the fine arts, and the form of literature that has for its object the creation of intellectual pleasure by the use of imaginative and passionate language. It is generally written in regular measure. However, it is not essential that its form be reduced to meter or rhyme, and in this widest sense poetry may be defined as that which is the product of the imaginative powers and fancy, and which appeals to the imagination and the sensibilities of others. Poetry is the earliest form of literature, and may be regarded the final and ideal of all pure literature. In this sense it ranks between prose and music, and the skillful poet intermingles the three lines of art by bringing prose into the realm of poetry and touching his rhythm with musical rapture.

The three forms of poetry generally recognized are epic, lyric, and dramatic. Epic poetry embraces the narrative form; lyric poetry includes all varieties of serious and comic song, the anthem, hymn, ode, elegy, and sonnet; and dramatic poetry embraces the poetry of action scenically represented, including both tragedy and comedy. Some writers also include didactic poetry, the poetry of thought or intellect; and satirical poetry, the form employing sarcasm, irony, ridicule, or humorous exaggeration. The different forms of poetry are not clearly distinguished, since all classes frequently contain elements of the different forms, which is specially true of epic poetry, since it partakes largely of the character of both lyric and dramatic imagination. Hindu poetry has its earliest types in the Rig-Veda, which consists in large part of rhythmal hymns, but the highest forms of Hindu

poetry are found in the epics of Rámáyana and Máhabhárata.

Portions of Genesis and Exodus comprise the earliest poetry of the Hebrews, and their highest forms are found in the Book of Job and the Psalms. Grecian poetry began with Homer and Hesiod, and flourished till about 500 B. C., and the greatest Roman poets are Virgil and Horace. Geoffrey Chaucer may be regarded the founder of English poetry, and Shakespeare its greatest representative. Other poets of England include Spenser, Milton, Dryden, Pope, Cowper, and Byron, while Burns is the greatest of Scottish poets. The most distinguished poets of Germany include Goethe, Schiller, Heine, Ludwig Uhlan, Christoph Wieland, and Martin Opitz. Among the most lustrous names in American poetry are those of Longfellow, Bryant, Lowell, Whittier, and Poe.

POINTER, a class of sporting dogs allied to the true hounds, and remarkable for their habit of pointing with the head toward the

POINTER.

game. The habit is instinctive, since it may be noticed in puppies, but it can be improved materially by training. The pointer is of Spanish origin, where its progenitor was brought from the East. It has since been crossed with the fox hound, and greatly resembles that class of dogs. A well-trained pointer stops immediately on scenting game, and then remains perfectly at rest.

POISON (poi'z'n), any substance that tends to cause death or seriously injure health when taken into the system by cutaneous absorption, swallowing, or inspiration. Poisons produced by animals are generally called venoms, and those resulting from diseased tissues are known as virus. The poisons sold in the trade are classed as animal, vegetable, and mineral, according to the sources from which they are derived. The general classification in medicine is governed by their effect upon the living tissues, and includes the four classes known as narcotic, narcotico-acrid, irritant, and petrescent or septic. Narcotic poisons have a special effect upon the spinal cord and brain, causing headache, obscurity of sight, giddiness, stupor, convulsions, and finally death. They produce no irritation, are not burning or acrid to the taste, and their effect upon the tissues is not marked, leaving no traces after death except a slight enlargement of the nerve-fibers and brain.

Among the principal narcotics are chloroform, opium, alcohol, belladonna, ether, chloral, hemlock, henbane, and India hemp. The narcotico-acrid poisons produce symptoms similar to those caused by narcotics, and vomiting, nausea, and convulsions. They consist of such substances as aconite, nux vomica, hemlock, poisonous mushrooms, and nicotine—the poisonous principle of tobacco. Irritant poisons include acids, some alkalis, mercury, arsenic, vegetable acrids, animal irritants, the vapor of nitrous acid, strychnine, and many others. The petrescent or septics consist of animal poisons, such as the bites of venomous snakes and rabid animals, the stings of insects, and the poisons generated by pestilential carbuncle. Many of the poisons are of value in medicine, and have a stimulating effect when taken in small quantities, but excessive use causes an impairment of the vital functions, while an unusual or large quantity produces death.

The poisonous principles contained in alcohol, opium, and tobacco are employed by a large number of people for stimulative purposes, but it has been shown successfully that none of them is a food and they do not enter into the support of life or living tissues. Laws to restrict or prohibit the improper use of these poisons have been made in many countries, and in the different states of the United States their sale is either restricted or totally prohibited. To impress the evils of these habits upon the minds of children, the subject matter of physiology taught in the public schools includes a systematic presentation of the evils of stimulants and narcotics upon the human system. It is hoped that sobriety and temperate habits, founded upon intelligence, will be obtained as a result.

POISON IVY. See **Sumac.**

POITIERS (pwä'tyā), or **Poictiers**, a city of France, capital of the department of Vienne, on the Boivre and Clain rivers. It is situated in a fertile region, has excellent railroad facilities, and modern municipal improvements. Walls surround the city, and it is otherwise fortified. A number of excellent bridges cross the rivers at convenient points. The city has several parks, a public library of 25,000 volumes, and a number of fine educational institutions and churches. The cathedral is the most noted public building, and there are remains of Roman temples, baths, an aqueduct, and an amphitheater. Among the manufactures are textiles, earthenware, toys, machinery, and utensils. Poitiers is one of the oldest

cities of France, and dates from prehistoric times. In 507 A. D. it was the scene of a decisive battle between Clovis and the Visigoths under Alaric, in which the latter were defeated. Near it Charles Martel won a victory over the Saracens under Abd-ur-Rahman in 732. In 1356 an English army under Edward the Black Prince defeated the French under King John II. about five miles north of the city. Its recent growth is due to steam and electric railroad construction. It has a large commercial trade and a considerable market in cereals and manufactures. Population, 38,220.

POKEWEED (pōk'wēd), a stout perennial plant native to the United States and Canada, where it is seen as a common weed by the roadside. It has large leaves, greenish-white flowers, and yields berries filled with crimson juice. Its roots are very large and branchy and contain emetic and cathartic principles. The berries yield medical properties useful in rheumatism. In some localities the young shoots are used as a substitute for asparagus, and in Portugal the crimson juice of the berries serves in coloring port wine.

POLAND (pō'lȧnd), formerly a powerful kingdom of Europe. It was called Polska by the Poles, meaning a plain. It included a large region south of the Baltic Sea, and at the time of its greatest prosperity had an area of 282,000 square miles, and a population of 24,000,000. At that time its length from north to south was about 710 miles and breadth 675 miles, thus embracing a large part of the fertile central plain of Europe. The only mountains of this region are the Carpathians on the southwestern boundary, and from them a range of hills extends toward the northeast and forms the principal watershed between the rivers flowing into the Black and Baltic seas. Its surface is a generally fertile and undulating plain, with an abundance of timber. The drainage toward the Black Sea is by the Dnieper, Dniester, South Bug, and Pripet rivers; while the Dwina, Vistula, and Nieman belong to the Baltic system. It has splendid forests of oak, birch, pine, and other valuable varieties of timber. Agriculture, dairying, and stock-raising are the principal industries, all of which are conducted on a large scale, but there is also an extensive commerce, with an adequate supply of lake and river navigation. At present railroad lines traverse the entire region, and there is a large mileage of canals and many thriving cities.

Poland was originally populated by the Polani, a Slavonic race, who occupied the region between the Oder and the Vistula in the early history of Europe. Small principalities existed for many centuries, but in 962 Mieczyslaw I. united the different communities and governed successfully until 992. He is classed as a representative of the Piast dynasty, but was himself a vassal of the emperor of Germany. It was in his reign that Christianity became the religion of the Poles, and in it was effected the union of the Polish people that endured until the latter part of the 18th century. In 992 Boleslaw the Great succeeded to the throne and reigned till 1025. He not only consolidated the kingdom, but extended it beyond the Dniester, Oder, and the Carpathians, and later annexed territory by defeating the army of Emperor Henry II. of Germany and a number of the Russian princes. The German emperors were required to recognize him as king, and henceforth Poland was one of the independent powers of Europe, a position it held for more than 700 years.

Among the causes that led to the decline of Polish power are the weakness of its rulers, protracted internal disagreements, extensive and intolerant power exercised by the Jesuits, want of natural boundaries, and the control of trade and manufacture by Germans and Jews. Local dissensions became so widespread under Stanislaus Augustus, who ruled in 1764-95, that Prussia, Russia, and Austria interfered with the government in 1772 and made the first partition of Poland. In this partition Russia received 42,000 square miles of Polish territory, Austria 27,000, and Prussia 13,000. Local dissensions not only continued, but disputes arose between the regions annexed and the different countries, and in 1793 Russia and Prussia advanced their armies against the fruitless resistance under Kosciusko. In the second partition that followed Russia took 96,000 square miles and Prussia 22,000.

Hostilities broke out anew the following year, in 1794, and Kosciusko led the Polish patriots with remarkable bravery, but he was overcome by superior numbers, and in 1795 the third and last partition took place. In this final division Russia received 43,000 square miles, Prussia 21,000, and Austria 18,000. In 1815 the division of Poland was rearranged by the congress of Vienna, and Russian Poland was organized as a constitutional monarchy. It existed in this form until 1830, when the French revolution induced the Poles to attempt to throw off Russian power. They were not only defeated, but practically all power was taken from the king of Poland, and the Russian language became the adopted tongue of all the courts and educational institutions. This part of Poland at present has a population of 10,500,000, about two-thirds being Roman Catholics. The portions of Poland included in Germany and Austria have become more fully reconciled and are in fact practically German in language and instinct.

The Polish language belongs to the western branch of the Slavonic tongue, and is closely allied to the Lusatian, Wendis, and Czech or Bohemian. It is still spoken by about 10,000,000 people, half of whom are in Russia, and the remainder in Austria, Prus-

sia, and Turkey. The language is rich in synonyms, has a precise orthography, and a fully developed grammatical structure. Compound words are rare, except as they have been introduced from other languages. Polish literature is not as rich in popular legends as that of other Slavonic tongues, and does not date from as early a period as the Czech. Early Polish writers employed the Latin language in their religious, political, and historical productions, largely because the Latin was cultivated under the direction of the church, but after the revival of learning in Europe numerous lexicons appeared in the Polish. The national song, entitled "Piesn Boga Rodzica," was written in 1408, and in 1455 Queen Sophia translated a large part of the Bible. In the 16th century Peter Kochanowski translated Tasso's "Jerusalem Delivered." The period between 1521 and 1621 was the most prolific in Polish literature, and Nicolas Rej is noted as the most eminent poet of that time. Subsequently many eminent writers contributed to the fund of literature, among them Mickiewicz, Slowacki, Zaleski, and Kraszewski. Polish literature includes representative productions in all branches, and is particularly rich in historical, political, and poetical writings. The chief centers of Polish influence are at Cracow, Warsaw, Wilna, and Paris.

POLAR BEAR. See Bear.

POLAR CIRCLE. See Arctic.

POLAR EXPEDITIONS, the exploring expeditions made by navigators to the north and south polar regions. The objects of these expeditions have been mainly those of finding new routes of travel and exploring high latitudes in search of an open sea. Navigation in these regions is rendered extremely difficult by intense cold and vast accumulations of ice, and there are millions of square miles still unexplored and unknown. The Norsemen were the first navigators to penetrate beyond the Arctic Circle. Besides exploring the northern part of the Scandinavian peninsula, they colonized Iceland, and in 1001 cruised along the northeastern coast of North America. Subsequently their navigators penetrated far north along the shores of Greenland, but the black death that visited Norway in 1347 caused Iceland to be neglected and their explorations were abandoned.

In the latter part of the 15th century an opinion prevailed in England that India could be reached by sailing northwest. Accordingly Henry VII. commissioned Sebastian Cabot in 1517 to search for a northwest passage by sailing around the north coast of America. In his explorations Labrador and Newfoundland were discovered, and soon after successive expeditions were made in the same region by Frobisher, Hudson, Davis, and Baffin, each of them discovering new fields, and their memory is perpetuated by some particular bodies or channels of water bearing their names. Fox and James made an expedition in 1631 to the northeastern region of North America. Soon after returning to Europe the belief became general that if a northwest passage from Davis Strait to Bering Strait could be found it would be practically unavailable for commercial purposes because of the intense cold prevailing in that region the greater part of the year. The enterprise soon fell into disrepute and remained neglected for more than a century, but King George III. revived it in the latter part of the 18th century. An expedition under Captain Phipps, later Lord Mulgrave, sailed to Spitzbergen in 1773, and after many hardships succeeded in reaching 80° N. Lat. Soon after Captain Cook made an unsuccessful attempt to penetrate beyond that point, and the enterprise was again abandoned until the beginning of the 19th century.

Captain Scoresby explored the east coast of Greenland in 1806 and reported a remarkably open sea. Soon after a reward of $100,000 was offered by the British government to the discoverer of the northwest passage. This led to numerous efforts, the most famous being that of Sir John Franklin, who embarked from England May 19, 1845. He sailed for Bering Strait from Lancaster Sound, and after enduring much difficulty with ice-floes, his ships were frozen in at a point near 70° N. Lat., where Franklin died in 1847. As no tidings from his expedition reached England, serious apprehensions began to spread, and many expeditions were sent to relieve those thought to be still alive. The first relief expedition started in 1847 under Richardson and Rae, and many others followed, but no tidings of the fate of Franklin's expedition were secured until in 1853, when Rae learned of its fate while exploring King William's Sound. Two years later portions of the Erebus and Terror, the two vessels with which Franklin sailed, were discovered by Anderson. One of the relief expeditions was under the direction of McClure, who sailed from Plymouth to Bering Strait in 1850. Thence he proceeded east and finally reached the Atlantic, and returned to England in 1854, thus being the discoverer of the northwest passage. Parliament granted him and his crew an award of $50,000, and he was knighted. A well established route exists at present between Davis Strait and Bering Strait, but it is of no practical value aside from supplying geographical knowledge.

European navigators were also active in attempting the discovery of a northeast passage to the Pacific Ocean at a comparatively early date. An expedition under Willoughby rounded Cape North in 1553, and three years later Burroughs explored the southern coast of Nova Zembla. Captain Cook entered Bering Sea in 1778 with the view of finding the northeast passage by sailing westward from Bering Strait, and soon after Russian

explorers made extensive expeditions, both on land and sea. The honor of discovering the northeast passage belongs to the Swedish explorer, Professor Nordenskjold, who sailed from Stockholm in 1878 and made a tour along the north coast of Eurasia, reaching Bering Strait in the early part of 1879. The north polar expeditions of recent times have been largely with a view of adding to science and reaching the pole regions.

Captain Coldewey was sent to the polar regions by the Germans in 1868, and again the following year, reaching the highest latitude yet attained on the north coast of Greenland. Austria sent Payer and Weyprecht in 1872, who penetrated the regions north of Nova Zembla and discovered Franz Josef Land. An expedition sent by the "New York Herald" in 1879 was under charge of Commander De Long, who, with the Jeannette, sailed northward from Bering Strait, but the vessel was wrecked in the ice in 1882. The expedition sent from the United States under Lieutenant Greeley in 1881-84 reached the farthest point north then witnessed by explorers, 83° 24′ N. Lat., but the terrible hardships caused the loss of nineteen of his party of twenty-six men. The most famous expedition of recent times is the one conducted by Nansen in the Fram. He sailed from Christiania, Norway, in 1893, and returned in 1896. The highest point reached by him is 86° 14′, the farthest north on record up to that time. He was the first to cross Greenland from sea to sea. In 1900 Duke Abruzzi reached 86° 33′, which is the highest latitude reached by explorers.

Dutch navigators were the first to penetrate far into the south seas, and the highest latitude reached by them is 63°, where their navigator, Dirk Cherrits, discovered the South Shetland Islands, located near Graham Land. In 1774 Captain Cook reached 71° 10′ S. Lat., and in 1819 the Russian navigator, Bellinghausen, discovered Alexander Land and Peter Land in 70°. Captain Weddell made an expedition to the south seas in 1823 and reached 74° 15′, but the highest point yet reached is 77° 32′. This high latitude was visited by James Clark Ross in 1841, who discovered South Victoria Land. He explored a portion of this region and found mountain peaks ranging from 9,000 to 13,000 feet above sea-level. He discovered an active volcano, height 12,390 feet, which he named Mount Erebus. No vegetation exists in South Victoria Land, and the region is much colder than the Arctic region at the same latitude. Snow lies perpetually about 18° farther toward the equator than in the Arctic region, and the expanse of ice is grand and wonderful.

POLARITY (pō-lăr′ĭ-tȳ), the quality of having opposite poles, specially the existence of two points possessing contrary tendencies. Polarity may be illustrated by the opposite tendencies in polarized light, by attraction and repulsion at the opposite ends of a magnet, and by the polarity of the earth. A spherical body at rest cannot be said to have definite poles, since its aspect is similar from every direction, but it assumes the quality of a polar body as soon as it rotates around some fixed diameter. The earth rotates around its polar diameter; hence it is a polar body, and the two ends of the axis form its north and south poles. Right and left direction and height and depth may be estimated only from a particular object fixed in place. Thus to a person north of the equator the sun and other celestial bodies apparently move from left toward right, while to one south of the equator they appear to move from right toward left.

POLARISCOPE (pō-lăr′ĭ-skōp), an optical instrument for examining substances in polarized light, or for measuring the polarization of light. Various forms have been devised. The important parts of the instrument consist of a polarizer for polarizing the light, and an analyzer by which it is observed, usually after passing through some medium to be experimented upon. An excellent polarizer may be made by fixing a glass plate at the proper angle, and then applying a small Nicol's prism, or a piece of Iceland spar or tourmaline.

POLARIZATION OF LIGHT (pō-lēr-ĭ-zā′shŭn), in optics, a change produced upon light so that its reflection and transmission are caused to vary with the position of the surface that reflects it, or of the medium which transmits it. All sides of a ray of light from the sun or any luminous body exhibit the same properties, but if it be reflected or refracted the different sides exhibit different properties. It is then called polarized light. Polarized light cannot be detected by the unaided eye. It is studied by means of an instrument consisting of two parts, one to polarize the light, and the other to show that it is polarized. The former is the polarizer; the latter is the analyzer, and the two in combination with the necessary adjustments constitute a polariscope, of which there are many forms. A number of mediums by which light may be polarized have been discovered. Among the various ways are its transmission through Iceland spar, or some other crystal that possesses the property of double refraction; by reflection from polished wood, water, glass, or other non-metallic substance; by transmission through transparent uncrystallized plates; and by transmission through a number of bodies imperfectly crystallized.

A simple experiment consists of cutting two thin plates of the crystal tourmaline parallel to the axis of the crystal and passing light perpendicularly through them. If the two be placed parallel to each other, some of the light is absorbed, but what passes through becomes polarized. If the two pieces be placed so the axes of the crystal cross each other, the light is quenched, since

the part passing through the first plate is polarized, but it is stopped by the second plate when crossed. Iceland spar is peculiar for its double refraction, and an object viewed through it appears double. If the crystal be placed over a dot and turned around, two dots are seen; one being apparently nearer than the other and revolving around as the crystal is turned. A word can be made to appear double in like manner. Tourmaline is a double-refracting crystal in which the ordinary ray is absorbed unless the plate be made exceedingly thin. If a thin plate of it be placed between the eye and a rotating crystal of spar, it is observed that the dots alternately disappear, thus showing that the two beams are polarized at right angles to each other. In reflecting light from glass, the polarizing angle of incidence is about 56°. Other substances polarize light by reflection, but only at the proper angle from them.

The polarizing angle of incidence at which light is most copiously reflected is called the plane of polarization. The wave theory offers the only satisfactory explanation of polarization. According to this theory, polarization is a change in the form of the ether waves. These waves resemble water waves in that they are transverse, but instead of the vibrations being in one plane, as in a water wave, the ether vibrations are in all possible planes across the path of the wave. Hence, if we could look at the end of a ray of light coming toward us, as we can at the end of a rod, we should see the molecules of ether vibrating across the direction of the ray in all possible planes. All these vibrations are reduced to two sets by a polarizer, as is shown by placing a plate of tourmaline between the eye and a rotating crystal of spar. One of them is called the ordinary and the other the extraordinary beam.

POLAR LIGHTS. See **Aurora Borealis.**

POLDER, the name applied in the Netherlands to redeemed land lying below the level of the sea, or below an adjacent lake or river. It is protected from overflows by dams, and there are embankments at regular intervals by which the water is carried to the river or sea. Pumps and other apparatus are employed in lifting the water upon the embankments. Usually the water is accumulated in centers by canals, often a network of connected channels, the lifting apparatus being placed at regular intervals. The most important polder is the redeemed Haarlem Lake. The land reclaimed in this manner is among the most fertile in Europe.

POLE, either of the two extremities of the axis of a sphere, around which it rotates. The northern one of the earth is called the north pole, and the southern is designated the south pole; each is 90° from the equator. The term is applied in astronomy to the two points of the heavens that appear to be touched by the axis of the earth, and around which the heavens apparently revolve. These points are called the celestial poles, and, since no stars indicate their exact position, the pole-star is reckoned from by the people north of the equator. The term is applied in an enlarged sense to a line passing through the center of a great circle perpendicular to its plane. In this sense the zenith and nadir are the poles of the horizon. Thus also are the poles of a meridian and of the ecliptic; and the term may be used in the same sense when speaking respectively of the celestial and terrestial poles as the poles of the equinoctial and equator. In physics the poles are two points at which opposite quantities are concentrated, which are distinguished as positive and negative, as the two poles of a battery and the poles of a magnet.

POLECAT, a carnivorous mammal of the weasel family. It resembles the skunk in having glands that secrete a liquid substance

POLECAT.

with a disagreeable odor, which it ejects when scared or irritated. The polecat has a brown color and bears a valuable fur. Its body is from fifteen to twenty inches long. The tail measures six inches, and the body is about seven inches in height. It sleeps by day, but comes out at night in search of food, feeding on newts, mice, rats, frogs, birds, and poultry. Polecats are native to America and Eurasia. They are sometimes called fitchet, and their fur is termed fitch.

POLE-STAR, or **Polaris,** the principal star of the constellation Ursa Minor, located at the extremity of the handle of the Little Dipper. It is situated about 1° 20′ from the north celestial pole, and from time immemorial has been called the north polar star. As it is of the second magnitude, it is of great value in navigation north of the equator. On the equator it is seen at the horizon, and if an observer could stand at the north pole it would appear directly overhead. Six of the nine pyramids at Gizeh, Egypt, have openings toward the north. A person standing at the openings 4,000 years ago would directly face Thuban, which was then the north star. The sup-

posed date of the building of the pyramids, in 2123 B. C., accords with that epoch. In the same manner, Polaris approaches and recedes from the north pole, though the period covers many thousands of years.

POLICE (pō-lēs′), a body of executive officers especially concerned with maintaining the quiet and good order of communities and cities. In some countries a police force is maintained to preserve civil order in the army, as distinguished from the officers vested with power to maintain military discipline. In others a civil police is supported as a general military organization, as the gendarmerie in France and the constabulary of Ireland. The police systems differ widely in their organization and control, and in the duties of their officers. In the United States the police comprises officers maintained by the authority of towns and cities, each municipality having its own police administration. Though of recent organization, it is quite similar to the form of organization maintained in most of the cities of Europe, especially Great Britain, Sweden, Germany, and Switzerland. However, in many countries the police force is more generally under the direction of states than in the United States, and the officers are often controlled for political purposes by rulers.

In former times European cities were entirely under the supervision of officers directed by the state or province, or this force was supplemented by a local police employed to watch the different parts of the city for the suppression of crime and the protection of life and liberty. This system was quite unsatisfactory, since the watchmen were inefficiently supervised by a local central superintendent. England was without a modern police system until in 1829, when Sir Robert Peel organized the metropolitan police for London, and since then the boroughs, counties, and cities have established similar local authority for municipal or district protection. The policemen in all the larger cities may be distinguished by a particular uniform, but besides those employed as open peace officers, there are secret policemen, more commonly known as detectives, who are not uniformed.

In this country the different states have power through the legislature to found and maintain systems of peace officers. Police regulations may be established by congress separately, but this function is applied only to the army and during times of insurrections. The several states have provisions for maintaining peace officers in the townships and counties, but these are elected and remunerated by the people locally. In counties they are known mainly as sheriffs, and in townships and towns as justices of the peace and constables. The police officers proper are provided for by law as officials in organized towns and cities, and are usually appointed by the mayor with the approval of the city council, though in some cities the mayor appoints a board of police commissioners, with the consent of the aldermen, and in this board is vested the power to appoint and supervise the police. In some states, as in Indiana and Missouri, the appointive power is vested in the governor. Below is a table showing the main points of interest regarding the police of the ten largest cities of the United States in 1900:

NAME OF CITIES.	Population	Number of policemen and officers.	One policeman per number of inhabitants.	Cost per year.
New York	3,437,202	5,160	666	$5,080,900
Chicago	1,698,575	3,442	493	4,150,680
Philadelphia	1,293,697	2,680	483	3,215,800
St. Louis	575,238	1,140	505	1,368,000
Boston	560,892	1,050	534	1,200,500
Baltimore	508,957	945	528	908,860
Cleveland	381,768	580	658	682,600
Buffalo	352,387	558	631	659,775
San Francisco	342,782	540	633	785,705
Cincinnati	325,902	490	663	512,850

Though the police systems of the large cities are somewhat differently organized and the duties of the various classes of police officers differ somewhat, in the main the regulations present the same general features. New York City being the largest municipality in America, we give in this article the main features of its police system. Up to 1845 New York had the night-watch system as its main organization for maintaining the peace, but in that year an efficient system was organized under a board of four police commissioners, and this was somewhat modified when Brooklyn became a part of Greater New York. At present the police regulations are as efficiently supervised as those of any large city in America. Besides the general superintendent and his direct assistants, there is a well-organized office force, including clerks and stenographers. Photographers are employed to make portraits of persons held on suspicion, and an adequate force of patrol sergeants and patrol policemen is on duty. The mounted policemen have charge of out-lying districts, over which they make frequent trips. The police department has charge of those who keep the streets clean. They inspect premises and sewers, and see to the enforcement of the general sanitary regulations. To facilitate the work of keeping the peace, they are assisted by a force of detectives, and have ambulance wagons for the care of men and animals disabled by accident or otherwise. In connection with the police department are detention camps and hospitals for the care of the sick and wounded.

POLITICAL ECONOMY (pŏ-lĭt′ĭ-kal ē-kŏn′ŏ-mў), or **Economics**, the science of the industries. As such it aims to investigate and explain the nature, relations, and laws of human wants, work, and wealth—three constant factors and elements of the

industries. There is no precise definition of political economy, since it is a science in process of formation, and no science can be clearly defined until it has been finished. The study of this science involves three stages, those of observation, imagination, and verification. Notions of economic laws are obtained by the observation of facts; mutual relations between certain groups of facts are established by imagination; and correspondence between the facts is established or disproved by observation, and when agreements are discovered the facts are said to be verified. Much has been said and written on political economy from remote antiquity, but practically all the extensive treatises date back little more than a century. A number of Greek philosophers made investigations, but most of them applied ethics as an essential element in the discussions, particularly Plato and Xenophon. Aristotle discussed the functions of money as an instrument of exchange and a measure of value. He treated the advantages of division of labor, called attention to the evils resulting from over-population, and distinguished between value as applied to exchange and value in use. Hesiod was perhaps the first Greek writer, and in his "Works and Days" recognized the divine disposing power in the different branches of human economy.

The Romans were practical, realistic, and utilitarian, but developed no vastly diversified system of production and exchange. This is due to the fact that their state was organized rather for military and political purposes than for the development of industries on the field and in the factory. Many of the Romans looked upon industrial arts and commerce as ignoble pursuits, even Cicero sharing that view. He joined Cato and Varro in advocating the culture of the soil rather than developing trade and manufactures. However, Pliny gave some attention to discussing value as applied in the industries. He showed the evil effects of transporting money from Rome, and looked upon servile labor as equally injurious to both the laborers and to the state. The Middle Ages include a vast transitory period in the economic activity of Europe. Feudalism was a hindrance to the growth of the industries, since the feudal lord denied the laborers a fair share in the distribution of wealth and taxed largely with the view of oppressing the laborer and maintaining the feudal system. With a gradual overthrow of the feudal system, labor began to develop in a freer atmosphere, and one by one the fetters of serfdom were broken down. In the 16th and 17th centuries the spirit of colonization led many Europeans to emigrate to new and undeveloped fields, and the spirit of enterprise at home received a marked impetus by the wholesome reforms resulting from free cities and the beginning of more extensive manufactures. Shortly after the great inventions that revolutionized all branches of industry followed, and in the 18th century such works as Hume's "Economic Essays" and Adam Smith's "Wealth of Nations" had a wide influence in revolutionizing public thought.

At present there are several widely different schools of political economy, among them the liberal, Christian, socialist, and historical or realist. The liberal school is also called classical. Its main doctrine is that human societies are governed by natural laws which we could not alter, even if we wished, since they are not of our making. The laws governing wages, capital, and distribution are thus looked upon as natural laws, and their effects as inevitable. The gradual elevation of humanity is thought to result from the efforts made by men and governments to observe these laws. According to the Christian school providential laws govern all social and physical facts, but their effect upon the institutions may be seriously deranged by the action of man himself. John Stuart Mill pointed out that, no matter what class might possess absolute power in a community, it would result in harm to the other classes, and this argument he applied against the Christian school of economists.

The socialist school holds that modern society is organized on an improper basis as the result of a long series of acts of injustice, which have been to some extent sanctioned by written laws. Its main opposition is directed against free competition and private property, holding that these are the two great causes that sacrifice social to private interest, and cause the wealth of a community to concentrate in the hands of a few individuals, while the great mass of people are disinherited. Karl Marx, of Germany, and Proudhon, of France, are among the many writers who have contributed works of remarkable influence to the literature of socialism. The historical or realist school stands in direct opposition to socialism, and had its origin in the German universities about fifty years ago. Roscher's "Treatise of Political Economy," published in 1854, is properly the beginning of this line of study. The realists turn to history for a study of social and economic facts, and base their teaching upon the observation of conditions. They include many of the leading statesmen of all civilized nations. Much of the labor legislation of the past twenty years is due to movements promoted by them, and they have set on foot a plan to effect international regulation of labor. The realists have gained an advantage over the liberalists, because they hold that governments may make laws to govern capital, wages, and distribution; over the Christian school in that they recognize possibilities for all people of whatever faith; and over the socialists because of looking upon free competition for all as a fundamental basis of human happiness.

Most writers limit wealth to those quanti-

ties having the three essential characteristics: utility, difficulty of attainment, and transferability. Value is a relative term, and may be defined as purchasing power and as power in exchange. The four branches or subdivisions into which political economy is divided are production, consumption, exchange, and distribution. Production treats of the creation of wealth. The three direct agents of production are land, labor, and capital, but the guardianship of government is also counted an indirect agent to facilitate it. Land comprises all natural resources, as soil, water, forests, and minerals still in natural deposits. Labor is defined as the human efforts and sacrifices voluntarily directed toward the production of wealth. Capital is the result of previous labor employed for further production. Consumption treats of the use of wealth, and is either productive or unproductive, the two differing in that productive consumption is a use of wealth resulting in the increase of value. Exchange comprises the transfer of commodities between different parties, and depends in volume and commodity values upon supply and demand.

A discussion of exchange involves a consideration of the question of money, the laws of exchange, protection and free trade, banks and banking, public and individual credit, and trusts. Distribution implies a division of wealth among those who have had a share in producing it, including the land owner, laborer, capitalist, and the government. This subdivision of political science is one that is receiving more and more attention from all classes, and the laws favorable to an equitable adjustment by awarding each individual the share to which he is entitled are largely of modern origin. However, other themes are concerned more or less with this particular question, but those relating to the effects of high and low wages as compared with the cost of living are immediately involved. Among the different themes engaging the attention of writers on this branch of political economy are those of unrestricted trade, artificial control of the principal products, over and under production, and the remedies for low wages. The means of relief proposed include trades-unions, coöperative associations, and copartnership in industry. The effect of immigration upon wages, the wages of women, rent, interest, and taxation are other questions receiving attention. See **Money, Free Trade, Labor,** etc.

POLITICAL PARTIES IN THE UNITED STATES. See **Democrat, Republican,** etc.

POLK, James Knox, eleventh president of the United States, born in Mecklenburg county, North Carolina, Nov. 2, 1795; died in Nashville, Tennessee, June 15, 1849. His father, Samuel Polk, was a farmer, and his uncle, Thomas Polk, was one of the signers of the Mecklenburg Declaration of Independence. He was brought up on the farm, and, after completing the common school course, took employment with a merchant, but, disliking commercial pursuits, he returned home and was instructed by a private tutor. In 1815 he entered the University of North Carolina as a member of the sophomore class, where he graduated in 1818 as the best scholar in mathematics and classics. This university conferred upon him a degree in law in 1847. In 1819 he entered the law office of Felix Grundy, an eminent jurist of Tennessee, and while pursuing legal studies formed an intimate acquaintance with Andrew Jackson. After being admitted to the bar in 1820, he established a law practice at Columbia, and in 1823 became a member of the Tennessee legislature.

JAMES K. POLK.

He married Sarah Childress in 1824, and in 1825 was elected to congress, where he served as an influential member till 1839, when he became governor of Tennessee. When he entered congress, he was the youngest member with one or two exceptions, and took a leading part in all the noted debates in that body. His first great speech was in favor of amending the constitution so as to give the people the power to elect the president and vice-president by direct vote. He opposed the appropriation of funds to the Panama Canal on the grounds that it would establish an unfortunate precedent and be likely to involve the United States in war with Spain. During the entire contest between President Jackson and those opposing him in relation to the national bank, he supported the administration, and as a member of the ways and means committee, in 1833, made a minority report unfavorable to the Bank of the United States. He held the office of speaker of the house from 1835 till 1839, and supported President Van Buren with the same ardor extended to President Jackson. The democratic national convention at Baltimore nominated him for president in 1844, and in the election that followed he defeated Henry Clay by a majority of 37,181 of the popular vote, and received 170 of a total of 275 electors.

The chief events of Polk's administration include the establishment of the United States Naval Academy, the annexation of Texas, the admission of Iowa, Texas, and Wisconsin as states, and the war with Mexico. The Mexican War resulted in the United States acquiring New Mexico and California. Other events include settling the Oregon boundary with Great Britain,

reënacting the independent subtreasury system, passing the act under which the Smithsonian Institution was established, effecting a treaty with New Granada by which citizens of the United States secured the right of way across the Isthmus of Panama, and creating the department of the interior. He declined to become a candidate for reëlection, and retired to his home in Nashville at the conclusion of his term. His remains were removed by the state to Capitol Square in 1893.

POLK, Leonidas, clergyman and soldier, born in Raleigh, North Carolina, April 10, 1806; died on Pine Mountain, June 14, 1864. He graduated from the West Point Military Academy in 1827, and soon after became a minister of the Protestant Episcopal Church. In 1837 he was made missionary bishop in the southwestern part of the United States, and three years later became bishop of Louisiana. He was strongly in sympathy with the secession movement, and at the beginning of the Civil War entered the Confederate army as major-general. Distinguished services in the battle of Shiloh caused Jefferson Davis to promote him to the rank of lieutenant-general, and he received command of the armies of Kentucky and Tennessee. He commanded in the battle of Chickamauga, and was relieved of his command on the charge of disobeying orders, but received another command in December, 1863. In 1864 he served with General Johnston against General Sherman at Atlanta, and was killed on Pine Mountain by the explosion of a Union shell.

POLL TAX, a tax levied on each poll or head. Most of the nations levy capitation taxes of varying amounts, and in the United States the power to collect such a tax is vested in the constitution and in the states. However, the national government has never exercised this function, and the constitutions of several states expressly forbid it. Those imposing the tax make it from fifty cents to $3 per year, though disabled persons and those below twenty-one and over forty-five years of age are usually exempt from it. Massachusetts and several other states make its payment a qualification for voting.

POLO, a game played on horseback, and in some respects resembling hockey. It originated in Asia, where it was played as early as the 8th century, and is thought to be the game mentioned in the "Arabian Nights" as tennis. British cavalry officers learned the game in India and introduced it into England in 1872. It is now a very popular game in the United States. The game is played on a space marked out, usually 200 yards wide and 300 yards long. The players are mounted on horseback and are armed with long polo-sticks, usually mallets having flexible handles, and with these they endeavor to drive a ball through the goal of the opposing players. The game is played with four or five on each side, and to succeed well requires good horsemanship and trained ponies. Formerly the standard rules required the ponies not to be more than fourteen hands high, but several associations raised the height to 14.2 hands in 1889. A number of American associations are maintained, and the game is steadily gaining favor, though it is somewhat expensive and requires well-bred ponies and carefully laid out grounds. American polo players attained considerable success in competing for prizes in the Exposition at Paris in 1900.

POLO, Marco, distinguished traveler, born in Venice, Italy, about 1254; died there in 1324. He was the son of Nicolo Polo, an eminent merchant, who traveled extensively in southern Europe and western Asia about the middle of the 13th century. Later he sailed with his brother, Matteo, on a mercantile tour from Venice, and after visiting Constantinople, they traveled in Persia, Central Asia, and China. In China they were favorably received by Kublai Khan, who manifested a keen interest in their narration of European enterprise, and commissioned them to visit the pope at Rome. They returned to Venice in 1269, and two years later organized a second expedition, which was accompanied by Marco Polo. In 1275 they reached the palace of Kublai Khan, and were again favorably received. This sovereign became greatly interested in Marco, since he showed remarkable aptitude in learning the Mongol language, and favored him with appointments on missions to the princes of adjacent countries. Later he became governor of Yang-tchou, a province of eastern China, where he served successfully three years.

The three Polos escorted a Mongolian princess to Persia in 1292, but Kublai died while they were in Teheran, and they resolved to return home, reaching Venice in 1295. In 1296 Marco Polo took part in the great battle of Curzola, in which the Venetians were defeated by the Genoese, and he was taken a prisoner to Genoa. While in confinement he dictated an account of his travels to a fellow prisoner named Rusticiano, which was entitled "Book of Marco Polo" and published in 1298. This work was received with much enthusiasm, but the minuteness with which the author described the wealth and beauty of China led many scholars to regard it fictitious. However, much of it was soon after verified by Christian missionaries, and it awakened intense interest in travel, thus leading the Portuguese to double the Cape of Good Hope and to reach Hindustan, while it aroused Columbus to seek a northwest passage and discover America. The "Book of Marco Polo" has gone through many translations and editions, and is still a work of much interest.

POLTAVA (pŏl-tä′vạ), or **Pultowa,** a city of Russia, capital of a government of the same name, at the confluence of the Vorlska and Poltavka rivers. Its streets are regularly platted and improved by modern

conveniences. Among the manufactures are cotton and woolen goods, machinery, clothing, and leather. It is the seat of several excellent educational institutions, a fine cathedral, and a splendid monument commemorating the victory of Peter the Great in 1709 over Charles XII. of Sweden. It is surrounded by a fertile agricultural country, and has an extensive trade in cereals, livestock, and lumber. Population, 44,431.

POLYBIUS (po-lĭb'ĭ-us), noted Greek historian, born at Megalopolis, in Arcadia, about 204 B. C.; died about 122 B. C. He was instructed in the science of politics and military arts by his father, who was a leading member of the Achæan League, and at the age of twenty-four years entered public life. In 168 B. C. war broke out between Macedonia and Rome, and shortly after 1,000 Achæans were summoned to Rome by commissioners to show why the Achæans had not assisted in the defeat of Perseus, the king of Macedon. Although most of this number were condemned to imprisonment, Polybius secured permission to reside in Rome, and while there formed a close friendship with Scipio Æmilianus. In 147 B. C. he accompanied that commander to Africa, and the following year witnessed the siege and destruction of Carthage. Shortly after he returned to Corinth, which he found in ruins, and many of the fairest cities of Achaia were in possession of the Romans. Polybius was welcomed by his countrymen. He gained their gratitude by making favorable treaties with the Roman conquerors, and later many statues were erected to his honor. He wrote about forty works on history, of which only five remain entire, while the others are studied from fragments or in extracts made from his writings. The principal work is his "History of Rome," in which he recounts the reasons why that country became powerful.

POLYCARP (pol'ĭ-karp), eminent Christian father, born about 68 A. D.; suffered martyrdom about 154. There is no certainty as to the date or place of his birth, but it is thought that he was educated at Smyrna, where he probably formed the acquaintance of the apostle John. Irenæus was his pupil at Smyrna, and to him the world is indebted for much information regarding Polycarp and the history of the church in the 2d century. Some writers assert that Polycarp was appointed bishop by the apostle John, though this is doubted by others, but all agree that his connection with the church from early manhood was intimate. He became the head of the church of Smyrna, and gathered about him large congregations, to whom he related the accounts received from those who had seen Christ in the flesh. His reputation extended into Macedonia and other regions, and in the latter part of his life he undertook a journey to Jerusalem to visit the Bishop Anicetus. On his return to Smyrna a persecution against Christians became widespread, though he labored uninterruptedly for the Christian cause. Popular feeling against the Christians steadily increased, and after the festive games at Smyrna it was decided that Polycarp should suffer unless he would recant. The proconsul wished to save him, but he remained steadfast in the faith and was burned alive. He is the author of a number of homilies and epistles. His "Epistle to the Philippians" is the only one extant.

POLYCRATES (po-lĭk'ra-teez), Greek tyrant of Samos, died in the latter part of the 6th century B. C. He was the son of Æaces, and, taking advantage of a festival to Hera, made himself master of Samos in 536 B. C. After conquering several other islands and a number of towns on the Asiatic coast, he defeated the inhabitants of Miletus. His rule was eminently successful, since he gave much attention to the development of the arts and industries, and constructed many substantial and famous buildings. His navy included more than one hundred ships, armed with a thousand bowmen. Aristotle relates that he employed his subjects on vast public works to make them satisfied with his reign, and the splendor of his palace was such that Emperor Caligula rebuilt it many centuries later. He collected a library, encouraged learning, and promoted commerce. In 525 B. C. Polycrates formed an alliance with King Cambyses of Persia against Egypt, and sent forty ships to promote an invasion of that country. However, the crew mutinied before reaching Egypt, and soon after returned to Samos. In 522 B. C. the Persian satrap of Sardis, Orœstes, enticed him to Magnesia, where he caused him to be crucified. Herodotus, the Greek historian, found many great buildings on Samos that he assigned to the reign of Polycrates.

POLYGAMY (pŏ-lĭg'a-mў), the practice of having a plurality of wives. The term is sometimes extended to the state in which a woman has more than one husband, but that custom is more properly called polyandry. Many of the ancient nations of Asia and Africa sanctioned or tolerated polygamy as a religious institution, and it was practiced by the Israelites and the patriarchs, even under the Mosaic law. In the early history of Greece it had some foothold, but disappeared entirely as civilization progressed, and it was never sanctioned by the Romans and the Germanic races. Monogamy is enforced in all Christian countries. Polygamy never was tolerated or practiced in the United States, but was sanctioned for a short time after 1843 by the founders of one branch of the Mormon Church. It is still practiced in many countries of Asia and various islands of the Pacific, and is sanctioned in practice by the Mohammedans. Polyandry is practiced in some regions of Thibet, in Ceylon, and among certain races of Australia and New Zealand.

POLYNESIA (pŏl-ĭ-nē'shĭ-ą), a name usually applied to the extensive archipelagoes of the Pacific Ocean, which include all the islands east of the Philippines, New Guinea, and Australia, and north of New Zealand. It embraces an innumerable number of islands and islets, distributed over about 11,000,000 square miles of ocean, though their combined area does not exceed 200,000 square miles, and the population is not more than 1,800,000. Three principal subdivisions are made of the whole group, embracing Polynesia Proper, Micronesia, and Melanesia, and each of these is again divided into smaller groups. Polynesia Proper occupies the largest ocean surface, and extends from below to regions far above the equator. The general direction of the islands of this and the other groups is from northwest to southeast. Besides a large number of scattered islands, it includes the archipelagoes of the Hawaiian Islands, and the Society, Cook, Marquesas, Tokelau, Phœnix, Austral, Tonga or Friendly, Ellice, Fiji, Navigator's, and Tuamotu Islands. The inhabitants of these islands belong to the Polynesian race, though many different classes of people have formed settlements in various islands.

The Micronesian division is situated between the Philippines and the northern part of Polynesia Proper, while its southern boundary is formed principally by the equator. The principal archipelagoes include the Carolines, Ladrones, Marshall, Radack, Pelew, Gilbert, and Brown Islands. Melanesia is situated northeast of Australia, south of Micronesia, and west of Polynesia Proper. It is the most important of the divisions, since it comprises the larger part of both the area and population. Among the most important islands of this group are New Guinea, New Pommern, and the groups of Solomon, Loyalty, Huon, Chesterfield, New Caledonia, New Hebrides, Santa Cruz, Admiralty, Norfolk, and Louisade Islands. Renewed interest has been centered in the northern part of this division within recent years, especially in the Bismarck Archipelago, where extensive developments are being made by Germany, Holland, and Britain. Many of the different islands and groups of Polynesia have much fertility of soil, while all have remarkable uniformity of climate, and some are noted for valuable deposits of many varieties of minerals. The islands differ in being either of volcanic or coral formation, and many of them combine both.

Darwin and other writers expressed the view that this vast region was once a continent, and that the land became submerged below the surface of the ocean. In this way the general trend of the volcanic islands is accounted for, since they are regarded the more elevated peaks of former mountian ranges, while the coral islands have been built up by coral polyps as the surface settled farther and farther into the sea. The highest mountains of the volcanic islands are found in the Hawaiian group, where the peak of Mauna Kea attains a height of 16,810 feet above sea-level, while the coral islands are only slightly elevated above the ocean surface. Most of the inhabitants are Polynesians, though there are many people of Malay origin. The languages differ widely, since various dialects are spoken in the separate groups, and there is a marked difference in the state of social and industrial development. Christian missions were first established in 1797 on Tahiti, an island of the Carolines, and since then successive efforts have been made in all the different groups, though the population has been gradually decreasing under the civilizing influence of Europeans. This is accounted for from the fact that these peoples represent the lowest types in the intellectual development of mankind. The products are diversified. They include principally fruits, coffee, cocoanuts, sugar, tobacco, cotton, rice, trepang, and cereals. Live-stock is reared in abundance. The first extensive discoveries made were by Magellan, who visited the Ladrones and other islands in 1521.

POLYP (pŏl'ĭp), one of various small aquatic animals, nearly all of which are inhabitants of the sea. Only two species of fresh-water polyps are known. They live largely in societies, and include the corals, hydroids, and polyzoa. The body is cylindrical in form and has a mouth at one end, which is surrounded by a circle of arms or tentacles; in this respect they resemble the many-armed cuttlefishes. This class of animals belongs to the lower scale. They have none of the five senses common to other animals, and are incapable of moving from their place. The coral polyps are perhaps the most interesting, since they are the builders of the coral islands.

POLYPHEMUS (pŏl-ĭ-fē'mŭs), a noted giant of Grecian legends, son of Poseidon and the nymph Thoosa, who is described as a one-eyed Cyclops. He and the Cyclop race lived in caves in the vicinity of Mount Ætna, where he spent his life in herding flocks of sheep on the mountain side. Ulysses and his companions were stranded by a storm on the island of Sicily, and were seized and confined in a cave by the giant. Polyphemus ate two of the Grecians the first day, and after returning with his flocks at night devoured two others the second day, but Ulysses at length contrived to intoxicate the giant with wine brought from the ship, and while in a helpless condition he destroyed the one eye of the giant with a heated olive staff. The giant being unable to see, rolled the stone from the entrance of the cave, and while he allowed his flock of sheep to pass out, the captives escaped in safety.

POLYTECHNIC SCHOOL (pŏl-ĭ-tĕk'nĭk), an educational institution that has courses of study in arts and sciences, and

whose special object is to induce the practical application of the instruction given. The first school of this class was established by a decree of the French convention on Feb. 13, 1794, and since then many others have been founded. These schools of France are devoted to instruction in architecture, physics, chemistry, mathematics, engineering, telegraphy, and other branches. The institution in which the military officers, engineers, and other public officials of France are trained is known as the Polytechnic School. Institutions of a like character are now widespread in European countries, and there are many similar in America. The first established in the United States was founded at Troy, New York, in 1824, and is known as the Rensselaer Polytechnic Institute. In the latter part of the same year the Franklin Institute was founded at Philadelphia. The Mechanics' Institute at Cincinnati, Ohio, adopted a similar curriculum in 1848. Special institutions or special practical departments in other institutions are now quite general in the United States.

POMBAL (pom-bäl'), **Sebastiao Jose de Carvalho, Marquis of,** statesman, born in Lisbon, Portugal, May 13, 1699; died in his castle of Pombal, May 5, 1782. He descended from a noble military family, studied law at Coimbra, and in 1739 became minister to London. King John V. made him ambassador to Vienna in 1745, but recalled him in 1750 to make him minister of foreign affairs. It was due to his efforts that the Inquisition was checked to a considerable extent in 1751. He improved the navy, the finances, and the police, and liberated the Indians of Brazil from slavery. He established elementary schools in Portugal, and in 1757 took effective steps against the Jesuits by requiring them to retire to their colleges. Two years later a plot against his life caused them to be banished from the kingdom. In 1777 Queen Maria I. ascended the throne, and, as she was largely under clerical influence, Pombal was deprived of office and many of his reforms were set aside.

POMEGRANATE (pŭm-grăn'ăt), a class of trees of the myrtle family. They are native to Palestine and the Mediterranean region, but are cultivated extensively for their fruit in many countries. The tree is of small size, usually from twelve to twenty feet high. It has shining leaves and twiggy branches, and bears large and brilliant red flowers. The fruit is about the size of an orange. It has a hard, reddish-yellow rind enclosing many large seeds, each of which is enveloped in a red pulp from which a cooling drink is made, and in Persia a wine. The rind and the flowers are used as a powerful astringent. There is a considerable trade in the pomegranate, especially in the warmer climates, since it is a particular favorite as a cooling and refreshing fruit during the warm seasons. Its culture is most extensive in southern Europe, western Asia, northern Africa, Mexico, and the West Indies. Several species survive the winters

POMEGRANATE.

in latitudes as far north as Pennsylvania, though the fruit does not mature.

POMERANIA (pŏm-ę-rā'nĭ-ą), a maritime province of Germany, which is bounded on the north by the Baltic Sea, east by West Prussia, south by Brandenburg, and west by Mecklenburg. It has an area of 11,622 square miles and a population of 1,750,000. The soil is mostly fertile, though along the Baltic the surface is low and sandy. Fine forests are abundant and it has a number of beautiful interior lakes. The drainage is principally by the Oder, Stolpe, and Persante. Among the minerals are bituminous coal and inexhaustible deposits of peat. Vegetables, fruits, corn, wheat, rye, barley, and oats are produced in abundance. It has considerable interests in beet sugar, hay, potatoes, tobacco, live-stock, and poultry.

Railroad lines penetrate all sections of Pomerania, and there are vast commercial enterprises, particularly at Stettin, one of the chief seaports of Germany. The fisheries are important. Formerly the inhabitants were principally Goths, Slavs, and Vandals, and it was named in the 5th century from a Slavish tribe called Pomerani. Its first mention in history is in 1140, and shortly after it became annexed to the German Empire. It was annexed to Sweden in 1637, but the house of Brandenburg regained it for Germany in different portions until the last Swedish possession was ceded in 1815. Formerly it consisted of Vorpommern and Hinterpommern, but it is now divided into the three governments of Stettin, Stralsund, and Köslin. The University of Greifswald is the principal educational institution.

POMEROY (pŭm'e-roi), **Mark Miller,** better known as Brick Pomeroy, journalist, born in Elmira, New York, Dec. 25, 1833; died in Brooklyn, May 30, 1896. After study-

ing in the common schools of New York, he entered the office of the "Corning Journal" as an apprenticed printer, and later established a newspaper in Corning, New York. In 1857 he began the publication of the "Lacrosse Democrat," but in 1868 founded the "Brick Pomeroy's Democrat" in New York. This periodical became known for its sensationalism, and attained an immense circulation. Politically, Pomeroy supported the greenback party in the later years of his life. He resided for some time in Colorado, where he located for his health and engaged in railroad and mine enterprises. He is the author of "Home Harmonies;" "Brickdust;" "Golddust;" "Nonsense," and "Perpetual Money."

POMONA (pō-mō′nȧ), the Roman goddess of orchards and fruit trees, who is mentioned in legends as the wife of Vertumnus. The latter long tried in vain to approach her, and finally did so in the guise of an old woman. Immediately he changed into a beautiful youth, and soon after wedded her. Ovid mentions her as the guardian of the boughs that bear the thriving fruit. She is represented in statuary as typifying autumn, and assumes the form of a lovely maiden laden with branches of fruit trees. Some sculptors represent her holding a fold of her flowing garment filled with grapes and other fruit.

POMONA, a city of California, in Los Angeles county, thirty-two miles east of Los Angeles. The surrounding country produces cereals and fruits. Among the manufactures are wine, canned fruits, earthenware, cigars, and machinery. It has good railroad and educational facilities. Electric lights, telephones, waterworks, and a library are among the improvements. Population, 1900, 5,526.

POMPADOUR (pŏm′pȧ-dŏor), **Jeanne Antoinette Poisson, Marquise de**, mistress of Louis XV., born in Paris, Dec. 29, 1721; died April 15, 1764. She was the daughter of François Poisson, an officer in the household of the duke of Orleans, but was brought up by a rich citizen named M. de Tournhein, who exercised great care in giving her a liberal and stylish education. She not only excelled in musical accomplishments and drawing, but charmed society with her remarkable personal grace and beauty, and with the exquisite art of her dress. In 1741 she married Le Normay d'Etoiles, through whom she became a queen of fashionable society in Paris. Soon after she met Louis XV. at a ball given to the dauphin, who at once became subject to her enticing influences, and in 1745 she was established at Versailles. Louis XV. bought her the estate of Pompadour, from which she secured the title of marquise, and for twenty years the public affairs of France were largely in her hands. It had been the avowed policy of France to weaken the house of Austria by courting the friendship of Germany, but she changed this because Frederick the Great had written verses relating to her, and her course finally brought on the Seven Years' War. The loss of Canada followed, but she continued to be the controlling influence in France, and even relieved the king of many of his duties by attracting his attention to amusements and theatricals. Immense sums of money from the national treasury passed to the marquise, and she obtained possession of much land and other property. However, her nervous system gave way under the exercise of social and political functions, and when at last told that death would result, she had herself dressed in full court costume in order to meet it in the height of fashion. Though extravagant in the extreme, she encouraged poets and philosophers, and patronized the "Encyclopedia."

POMPEII (pŏm-pā′yē), an ancient city of Rome, located in Campania, at the foot of Mount Vesuvius. It had a beautiful site on the Bay of Naples, near which the Sarnus River has its mouth, and in the time of the latter part of the republic and the early part of the empire it was noted as a favorite retreat and residence city of the wealthy Romans. The city was founded about 600 B. C. by the Oscans, and after passing through the possession of various powers, it became a Roman possession about 100 B. C. Under the Romans it was made a seaport and trade center of importance. Fine villas were built there by noted military men and statesmen, among them Cicero. An earthquake visited it in 63 A. D., when many of its splendid buildings were destroyed, but the Romans at once began its rebuilding on a much grander plan, and within a few years it had a population of about 25,000. The calamity that finally destroyed the city occurred in 79 A. D., when great eruptions of cinders, ashes, and melted rocks burst from Mount Vesuvius. This volcano had been inactive for ages, but when it suddenly broke forth on August 24 the accumulated force completely overwhelmed the people. For three days a continuous stream of lava flowed over the city, and dense volumes of smoke obstructed the light of the sun, while the panic-stricken citizens were further alarmed by repeated earthquake shocks that appeared to heave and lower the surface in consecutive waves.

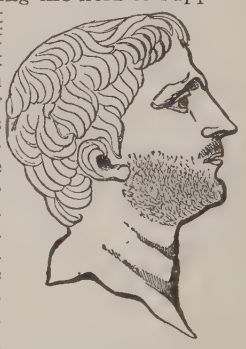
Amid the fearful disturbance the citizens rushed rapidly from the city, but many were buried by the lava or suffocated in the gases that escaped from the burning mountain. Both Pompeii and Herculaneum were destroyed, but the former was buried so deeply that all attempts to restore it were abandoned by Emperor Titus, who had organized commissions to relieve the sufferers and rebuild the city. At present the mass covering the city has an average thickness of twenty feet, but some of this was cast up

from the volcano by subsequent eruptions. The city was entirely lost in the Middle Ages, partly because the Sarnus River had been turned from its course and the coast regions had been raised by the disturbance so the site of the city was more than a mile from the Bay of Naples. In 1748 the first discovery of the lost city was made by sinking a well from a vineyard cultivated in the vicinity. The workmen discovered a beautiful chamber containing excellent statues and other productions of great beauty. Soon after extensive excavations began to be made, and in 1755 the theater, amphitheater, and other buildings of historic interest were excavated.

A system of excavations was promoted under the Italian government in 1760 for the purpose of restoring a large part of the statues and other valuable works of art, and in the reign of Murat, from 1808 to 1815, the Street of Tombs, the Forum, several public buildings, and a number of residences were excavated. Subsequently Victor Emmanuel devoted public funds to excavations, and secured many of the ancient works of art that may now be seen in the Italian and other European museums. These excavations show that the city was built in the form of an oval, with straight and regular streets, but some of them were not more than from fifteen to twenty feet wide, though the principal streets had a width of about thirty feet. The streets were paved with blocks of lava. The houses were largely of concrete, though bricks were used in some structures, and many of them were from two to three stories high. Shops and offices occupied the lower floors, and the upper were used for dwellings. Light was provided by a hall in the center of the building, which was connected with the street by narrow passages, and all the rooms and apartments were small.

The architecture itself was not of particular interest, except as found in the public buildings, but the works of art are of much value, since they include specimens of the great masters and throw considerable light on ancient history. Among the most notable public buildings are the Temple of Mercury; the Pantheon, or Temple of Augustus; the Temple of Jupiter; the Temple of Venus; the Amphitheater; the Basilica, and the Curia. The private villas of Sallust, Marcus Lucretius, and Cicero have been located, and a number of paintings and ornaments have been secured from them. The number of skeletons found is not more than 300. They have been exhumed largely from basements, thus indicating that most of the citizens escaped or were destroyed by the burning lava. The city at its greatest prosperity is thought to have had from 30,000 to 50,000 inhabitants.

POMPEY, Cneius Pompeius Magnus, eminent Roman, born Sept. 29, 106 B. C.; died in Egypt, Sept. 28, 48. He was the son of Pompeius Strabo, and under his father's direction received careful training in military arts, entering the field to support Sulla in his contest against the party of Marius and Cinna at the age of seventeen years. Two years later he raised three legions to aid Sulla. By decisive movements he drove the army supporting Marius from Sicily and Africa, and shortly after joined Sulla at Rome. He was surnamed Magnus (Great), a title which he always retained, and, though only of the equestrian rank, he was given a great triumph in the capital. His next success was to repel the forces of Lepidus from Italy and quash the revolt raised by Sertorius in Spain, and on his return to Rome, in 71 B. C., he was given a second triumph. His efficiency made him the idol of the people, and, though not of legal age and without official experience, he was made consul by the removal of his disabilities under a special act of the senate.



POMPEY THE GREAT.

Pompey obtained the gratitude of the people a second time by driving the pirates from the Mediterranean Sea, in 67, and shortly after followed his victory over Tigranes, king of Armenia; Mithridates, king of Pontus; Antiochus, king of Syria, and the capture of Jerusalem and the complete subjection of the Jews. He returned to Italy after this marvelous campaign extending over four years, and in 61 entered Rome, where the third triumph was given in his honor, the most magnificent ever witnessed there. It was his desire that the senate ratify his conquests and acts in Asia and parcel much of the lands to his veterans, but when that body refused to accede to his wishes, he formed the first triumvirate with Julius Cæsar and Crassus. Shortly after he married Cæsar's daughter, Julia, and for some years the alliance was one of great political significance.

Cæsar operated in Gaul with a vast army for nine years. There he attained glory by continuous success, but Pompey devoted that period to directing events at Rome. The senate appointed him sole consul, and, after the death of Julia in 54, he again joined the aristocratic party, filling the most important offices with political opponents of Cæsar. It became his ambition to deprive Cæsar of his command, and accordingly the senate demanded that his army be disbanded and it declared Cæsar an enemy to the republic. However, Cæsar defied both Pompey and the senate, and in 49 crossed the Rubicon. He became master of Italy without striking a blow, while Pompey fled

to Greece. In 48 the two contending armies met on the plains of Pharsalia, where Cæsar made himself the master of the Roman world by defeating Pompey in a decisive battle, while the latter fled to Egypt. He was betrayed by the ministers of Ptolemy, and while landing from a boat was treacherously assassinated by one of his former centurions. His head was embalmed and presented to Cæsar on reaching Egypt, but that commander was displeased by such a sight and ordered that the assassin be executed.

POMPEY'S PILLAR, a celebrated column of red granite, standing on an eminence south of Alexandria, Egypt. It is built in the Corinthian order, and may be seen about a quarter of a mile south of the walls of the city. Its height is ninety-eight feet nine inches, the shaft comprising seventy-two feet of this elevation, and it measures about twenty-nine feet in circumference. It is supposed to commemorate the conquest of Alexandria by Diocletian in 296 A. D., and the Greek inscription at the base relates that it was erected by Publius, prefect of Egypt, in honor of that noted conqueror. A splendid circus and a forum were near this monolith in ancient times.

PONCE DE LEON (pōn'thā dā lā-ōn'), **Juan**, Spanish explorer and conqueror, born at San Servas, Spain, in 1460; died in Cuba in July, 1521. He was first engaged as a page at the Spanish court, and afterward served in the military forces sent against the Moors. In 1493 he accompanied Columbus on his second expedition to America. Soon after he commanded an army that conquered Porto Rico, of which he became governor in 1510, but lost his position two years later. Though amassing great wealth, he lost his health, and conceived the idea that a fountain could be found that would impart perpetual youth to all who would partake of its waters. On March 27, 1512, he discovered Florida, and landed a short distance north of the present city of St. Augustine. He returned to Spain in 1513, where he was appointed governor of the region he had discovered, and received equipments to conquer and colonize it. He landed in 1521 but was met by a hostile force of Indians, who killed a large number of his followers and drove the remainder back to their ships. Ponce de Leon was wounded by a poisoned arrow, and soon after died from its effect.

PONCE DE LEON.

PONCHO (pŏn'chō), an article of dress resembling a cloak, and much worn by the Spaniards and Indians of South America. It is made of a rectangular piece of woolen or other cloth, usually from five to seven feet long and four feet wide. A hole in the middle enables the wearer to pass it over the head, and it hangs loosely before and behind, leaving the arms free. Many of the military men wear ponchos of waterproof cloth.

PONTCHARTRAIN (pŏnt-chăr-trān'), a lake of southern Louisiana, situated immediately north of New Orleans, about five miles west of the Mississippi. Its length from east to west is forty miles; width, twenty-five miles. It is connected by two canals with New Orleans. There is also connection with the Mississippi Sound, thus facilitating transportation from New Orleans and the eastern part of Louisiana to the Gulf of Mexico. The lake is a favorite summer resort, and many beautiful villas occupy the high and healthful banks on its northern shore.

PONTIAC (pŏn'tĭ-ăk), a city in Michigan, county seat of Oakland county, on Clinton River, twenty-five miles northwest of Detroit. It is conveniently connected with other trade centers by several trunk railways, has excellent public schools, and many modern municipal conveniences. Pontiac is the seat of several fine churches and a state insane asylum, and has convenient county buildings. Among the manufactures are flour, machinery, woolen goods, wagons, lumber products, and earthenware. The surrounding country has valuable forests, and yields large quantities of cereals, dairy products, and wool. Electric lights, pavements, and waterworks are among the improvements. Population, 1904, 10,884.

PONTIAC, noted chief of the Ottawas, an Algonquin tribe, born about 1712; slain in 1769. He was an Ottawa Indian, but gained influence as a leader of the Pottawattamies and Ojibways, and contributed largely to Braddock's defeat in 1755. His influence led to continuous hostility with the English, and after the French had surrendered Canada, he organized a compact among the Indians with the view of exterminating the English settlers. It was agreed that a general attack should begin on May 7, 1763, when his braves successfully reduced Mackinaw, Sandusky, Presque Isle, and other English posts, but Detroit succeeded in repelling the attacks, which took the form of a five months' siege. In 1766 a peace was concluded, by which Pontiac was compelled to recognize the English claims. Three years later he was killed by a Kaskaskia Indian, who was under the influence of liquor, at Cahokia, Illinois, opposite St. Louis.

PONTIFEX (pŏn'tĭ-fĕks), the title given by the ancient Romans to members of one of the two celebrated religious colleges, the

other being known as the College of Augurs. There were originally five pontiffs of this order of priests, the president being styled Pontifex Maximus, but the number was afterward increased to nine, and later to fifteen. The pontiffs were not charged with conducting sacrifices, nor were they obliged to worship any particular divinity, but they had general control of the official religion, and their head was the highest religious authority in the state, thus being neither subject to the people nor to the senate. Only patricians were eligible to membership in the Pontifex until 300 B. C., when the number was increased to nine under the Ogulnian law, and four of the pontiffs were selected from the plebeians. Tib. Coruncanius was the first plebeian to be selected to the high dignity of Pontifex Maximus, being elevated to that position in 254 B. C. In 81 B. C. the number was increased to fifteen by Sulla, and Julius Cæsar added himself shortly after as the sixteenth, holding the position of Pontifex Maximus. With the beginning of the empire the highest dignity was bestowed upon the emperor, and the title passed in succession to the ruling sovereign. In the time of Theodosius the title became equivalent to pope, which is now one of the designations of the head of the Roman Catholic Church.

PONTIFICAL (pŏn-tĭf'ĭ-k*al*), a service book of the Roman Catholic Church, which contains rites and ceremonies pertaining to sacraments and public services. The pontifical now generally in use, commonly known as "Roman Pontifical," was first published in 1485. It was revised in 1596 by authority of Clement VIII. Its contents include prayers and ceremonials, and services for use in religious professions, ordinations, consecrations, benedictions, and sacraments. The "Ceremonials" is a similar service book, but is devoted particularly to ceremonials in vespers, mass, and other solemn offices. The learned Pope Benedict XIV. is the author of the most prized edition.

PONTINE MARSHES (pŏn'tĭn), a marshy region between Rome and Naples, stretching from Velletri to the sea, and forming the southern part of the Roman Campagna. It is twenty-six miles long, varies in width from four to fifteen miles, and owes its existence to an obstruction of the streams rising in the Volscian Hills, due to elevated sand accumulating along the Mediterranean shore. Many attempts were made in ancient times to reclaim this marshy region, the first being by the consul Cornelius Cethegus in 160 B. C. Julius Cæsar projected a system of complete drainage, but his untimely death caused his plans to remain unexecuted, and nothing more was done until Pope Boniface VIII. constructed a large canal and redeemed a region in the vicinity of Sezze. Other improvements were made in 1417. Pope Pius VI. began a general system of drainage in 1678, and during the succeeding ten years reclaimed a large part of the area, though much of it was given up as irreclaimable. At present the region has many excellent farms, other portions supply fine pasturage for domestic animals, and the remainder is still an extensive and unhealthful marsh.

PONTOON (pŏn-tōōn'), in military engineering, a floating vessel supporting the timbers of a military bridge. Ordinarily, a number of pontoons are connected, thus forming substantial support for a temporary bridge, which serves as a means for the safe passage of an army over otherwise impassable streams. The pontoons are boats, air-tight tin vessels, wooden frames covered with india-rubber, or other devices. Bridges of this character are of vast importance to a marching army, and are usually carried by an organized train.

PONTUS, the name anciently applied to an extensive region in the northeastern part of Asia Minor, bordering on Armenia and Colchis in the east, and extending westward to the Halys River. It included the regions north of the Anti-Taurus and Paryadres Mountains, thus corresponding somewhat to the Turkish governments of Sivas and Trebizond. Pontus was governed by a Persian satrap until the conquest of Asia Minor by the Greeks. After the death of Alexander the Great, in 323 B. C., Mithridates II., a representative of an independent line of princes, came into possession of the region. He was succeeded by a number of Pontine sultans, the most powerful being Mithridates VI., who successfully resisted Roman encroachment for many years, but was finally conquered in 65 B. C. by Pompey. Shortly after Pontus was divided, but the principal part was annexed to Bithynia. Pontus developed a high degree of civilization. Its people engaged in agriculture, commerce, manufacture, and fruit-raising. The principal cities were Pharnacia, Trapezus, Cabira, and Amisus.

POOLE, William Frederick, librarian and bibliographer, born in Salem, Mass., Dec. 24, 1821; died March 4, 1894. He graduated from Yale University in 1849, and while in his junior year prepared the first edition of "Index to Periodical Literature," which he revised and enlarged from time to time. In 1851 he was chosen assistant librarian of the Boston Athenæum and became principal librarian in 1856. He held like positions in Cincinnati and Chicago in subsequent years, serving as librarian of the Chicago Newberry Library from 1887 till the time of his death. Poole was president of several associations, among them the American Historical Association and the American Library Association. He edited "The Owl" in Chicago, and published "Mather Papers;" "Orthographical Hobgoblin;" "Battle of Dictionaries," and "Salem Witchcraft."

POONA (pōō'nä), or **Puna**, a city of British India, in the presidency of Bombay,

about 120 miles southeast of the city of Bombay. It is quite well built on a desirable site, and has several important railroads, but the older part of the city has crooked streets and districts quite poorly provided with sanitary conveniences. Among the chief public institutions are the Deccan College, a public library, an arsenal, several colleges, a teachers' training school, several hospitals, and a number of churches and temples. It has manufactures of cotton and woolen fabrics, jewelry, ornaments, silk, and utensils. Poona is the military station for a large region of India, and north of the town is a line of barracks and military hospitals. The inhabitants consist largely of Brahmans. It was formerly the capital of the Mahrattan princes, but was annexed in 1818 to the British possessions. Population, 161,550.

POORE, Benjamin Perley, author and journalist, born in Newburyport, Mass., Nov. 2, 1820; died in Washington, D. C., May 30, 1887. After attending the public schools, he became an apprenticed printer, and in 1838 began editing the "Southern Whig" in Atlanta, Georgia. In 1841 he visited Europe, and served in an official capacity with the American legation at Brussels. On returning to America in 1848, he was made historical agent for Massachusetts, collecting ten volumes of valuable matter from the archives in France, and in 1851 became editor of the "Sunday Sentinel." He was appointed clerk of a senate committee in 1854 and later secretary of the United States Agricultural Society, and became editor of the "Congressional Directory" in 1867. His writings include "Campaign Life of Zachary Taylor;" "Rise and Fall of Louis Philippe;" "Reminiscences of Fifty Years in the National Metropolis;" "Federal and State Charters," and "Conspiracy Trial for the Murder of Abraham Lincoln." In 1855 he compiled for the government a catalogue of publications issued by the United States from 1774 to 1881.

POOR-LAWS, the legal enactments providing for the collection and disbursement of funds for the maintenance of those lacking the necessary means of subsistence. All the nations have made provisions for supporting those who are unfortunate and without means of support, and they have regarded none so indigent or wretched as to refuse to supply them with the ordinary necessaries of life, such as shelter, clothing, and food. Charitable institutions had their beginning in countries of the East, where it was made a religious duty to give alms, but many of the states made provisions for supporting the poor as a matter of governmental policy. However, the support accorded indigents was at first more largely administered through religious teachers, each local organization providing for the unfortunates in its particular parish or vicinity. This plan afterward became institutional, and was fostered by the various schools and monasteries of early times and through the Middle Ages, though in most of the civilized nations it has given way to governmental support. It is still fostered to a greater or less extent in practically all countries. The ancient nations of Europe discouraged begging, and made it a state policy to provide for the employment and support of all to such an extent that the necessaries of life could be obtained without appearing in public to entreat for assistance.

The Grecian states generally provided for the relief of the poor, though in some of them were no special provisions of that kind. The Romans enlarged upon the Grecian system by the encouragement of industries, and, where the people needed support or employment, committees usually provided the means. The plan of providing seed for crops and subsistence until a supply could be raised was one generally in favor among the Romans, but Cicero and other writers discouraged such support except where it was actually needed, since they looked upon it as the means of creating a class of idlers who would ever after look for paternal governmental aid. With the rise of the feudal system, after the fall of Rome, the condition of the poor and laboring classes assumed a form of serfdom, and it was natural for the feudal lords to take all the products of the laborer above his actual needs. Thus this system brought on a state in which the laboring man and the poor generally were dependent upon the feudal lords for all necessaries of life. During this time the church developed its functions as a supporter of the needy, and the numerous abbeys and monasteries established a system of doles for the poor similar to that of the Mohammedan countries, where alms are still distributed to the poor at the mosques.

Legislation to tax all the people for the support of the poor may be said to date in Europe from the earliest civilization, though the taxes imposed were at first of a special character, and were levied only in cases of emergency. The first general law in England dates from 1388, but this was revised in 1601 to such an extent that it may be said the British poor-laws date from that time. By the provisions then established all paying taxes were required to contribute an equitable share toward supporting the poor, and overseers were provided to personally supervise the granting of relief and the care of the needy. In some countries the workhouse system was supplied, under which all those in need of support were required to take lodging in the public workhouse, and it was made incumbent upon them to render all the services possible in consideration of their care and support. A law of this kind was in force in England until 1796, when provisions were made for granting the poor support outside workhouses, the relief usually being only a part of the means necessary, since

each individual was expected to earn at least a portion of his living, but in cases where that was impossible the relief granted provided for the entire support. At present the support of the poor is a local matter in France and Germany and most other countries, and under the general laws each local district is required to levy a general tax and see to it that an adequate amount is provided for all those in need.

The support of the poor in the United States is left directly to the several states, and as a rule the legislatures have provided for the maintenance of various institutions for those dependent and helpless. Formerly the poorhouse was the common receptacle for all the unfortunate and indolent, from the fatherless infant to the idle beggar. At present there are adequate provisions for the defective, dependent, and indigent of all classes, and many of the institutions possess training and educational features. Thus there are separate schools for the idiotic and feeble-minded, deaf and dumb, blind, insane, the children of dependent parents, incorrigible children, and those neglected. The poorhouses are mostly under the control of county commissioners, and are supported by a general county tax. In most of the states they are maintained on farms, where their labor is utilized to some extent in the culture of cereals, fruits, vegetables, live-stock, and bees, thus making it possible for those able to exercise at least a limited amount of physical energy to aid in making the institution partially self-supporting. The total number of inmates in the poorhouses of the United States is about 80,500, and there are fully 115,500 beneficiaries in the benevolent institutions. Most of the states have provisions under which the county commissioners may provide partial support for the poor outside the poor-farm, and this is generally taken advantage of where the individual or family has means limited below actual need, the public support granted being less in the aggregate than the cost of maintenance at the county poorhouses. Perhaps, there is no line where the rules of civil service apply more effectually in the selection of officers than in the case of superintendents of poorhouses and poor-farms, since in many instances the selections are made for political reasons, and not because of peculiar fitness to manage and guide the important work of such institutions.

POPAYAN (pō-pī-ăn′), capital of the state of Cauca, in Colombia, on the Cauca River, 225 miles southwest of Bogota. It is surrounded by an elevated but fertile plain, and dates from 1537, when it was founded by Spaniards. It was the seat of great commercial life until 1834, when an earthquake nearly destroyed it, but it has since developed considerable enterprise. Popayan is the seat of a university, cathedral, and hospital, and has a number of beautiful public and private buildings. It also is the see of a bishop. A commercial road extends from it to Truxillo, Peru. Population, 21,500.

POPE, a title applied originally to any bishop of the Christian Church, but later to the patriarch of Alexandria, and now to any priest of the Greek Church and to the bishop of Rome. This article treats particularly of the latter, who is the supreme pontiff and visible head of the Roman Catholic Church. He is regarded by that church the vicar of Christ and successor of St. Peter. The title was applied to all the bishops of the Roman Catholic Church in the early centuries, but a council convened at Rome in 1076, at the instance of Gregory VII., resolved that it should be applied only to the bishop of Rome. There was a long struggle between the Eastern and Western churches for superiority, but the tradition that the apostle Peter founded a church in Rome and afterward suffered martyrdom there gave the Western church preëminence. It was quite natural that the bishops located at the imperial city should acquire precedence in influence and power, and that the widespread conversion to Christianity should ultimately give them large influence in temporal matters.

Emperor Valentian III. issued a decree in 445 recognizing the bishop of Rome as primate, but for more than 300 years papal measures met with violent opposition. The division of the Eastern and Western churches in 1054, known as the Greek and Roman churches, ended the contention between the two bodies. Temporal power, though previously claimed, was not fully established until in 754, when Pepin, king of the Franks, recognized such authority. In 774 Charlemagne confirmed the temporal power of the pope and enlarged his dominion, and in 1076 Princess Matilda, daughter of Duke Boniface of Tuscany, made the Holy See heir to her extensive possessions. For many years powerful contentions between the states of the church and the rulers of Europe were common, and France, under Philip the Fair, was the first power to successfully resist papal authority. The rise of Protestantism under Luther caused the pope to lose fully one-half of Europe, and this loss was never regained. When the Thirty Years' War was ended with the treaty of Westphalia in 1648, religious tolerance was established or foreshadowed in all the countries of Europe, and the papal revenues not only decreased, but the bulls issued from Rome no longer had material effect outside the states of the church. Conditions were soon brought about that made the decline of temporal power rapid.

When the Franco-German War began, in 1870, Napoleon III. was obliged to withdraw the French troops from Italy. This circumstance was taken advantage of by Victor Emmanuel, king of Italy, and on September 20 of that year he entered Rome and took possession of the palace for the Italian king-

dom. The pope has lived in seclusion since that time, being stripped of all temporal power, but his influence in spiritual matters has in no wise been interfered with. In 1870 the Vatican Council decreed that the pope has supreme power in all matters of faith and discipline pertaining to the pastors and the faithful, and proclaimed that he has infallibility by divine assistance when in his apostolic office he defines a doctrine of faith and morals. The pope is addressed as "Your Holiness," and his insignia embrace the straight corsier, the pallium, and the tiara or triple crown. He may not nominate his successor, since that power is vested in the College of Cardinals, who usually select one of their own number.

Below is a list of the popes as published in the "Roman Notizie," the dates showing the beginning of their pontificates. Names placed under are those claiming the dignity of pontiff, usually called anti-popes:

	A. D.
St. Peter	42
St. Linus	66
St. Anacletus	78
St. Clement I	91
St. Evaristus	100
St. Alexander I	108
St. Sixtus I	119
St. Telesphorus	127
St. Hyginus	139
St. Pius I	142
St. Anicetus	157
St. Soterus	168
St. Eleutherius	177
St. Victor I	193
St. Zephirinus	202
St. Calixtus I	217
St. Urban I	223
St. Pontianus	230
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St. Cornelius	250
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St. Marcellus I	308
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St. Marcus	336
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St. Damasus I	366
St. Siricius	384
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St. Zosimus	417
St. Boniface I. / Eulalius	418
St. Celestine I	422
St. Sixtus III	432
St. Leo I., the Great	440
St. Hilary	461
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St. Gelasius I	492
St. Anastasius II	496
St. Symmachus	498
St. Hormisdas / Lawrence	514
St. John I	523
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Boniface II. / Dioscorus	530
John II	533
St. Agapetus I	535
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Pelagius I	555
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Benedict I	574
Pelagius II	578
St. Gregory I., the Great	590
Sabinianus	604
Boniface III	607
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Boniface V	619
Honorius I	625
Severinus	640
John IV	640
Theodorus I	642
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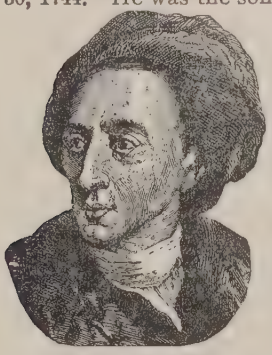
Conon / Theodorus / Paschal	686
St. Sergius I	687
John VI	701
John VII	705
Sisinnius	708
Constantine	708
St. Gregory II	715
St. Gregory III	731
St. Zachary	741
Stephen II	752
Stephen III	752
St. Paul I. / Constantine / Theophylactus / Philip	757
Stephen IV	768
Adrian I	772
St. Leo III	795
Stephen V	816
St. Paschal I	817
Eugenius II	824
Valentinus	827
Gregory IV	827
Sergius II	844
St. Leo IV	847
Benedict III. / Anastasius	855
St. Nicholas I	858
Adrian II	867
John VIII	872
Martin II., or Marinus I	882
Adrian III	884
Stephen VI	885
Formosus	891
Boniface VI	896
Stephen VII	896
Romanus	897
Theodorus II. / Sergius III.	898
John IX	898
Benedict IV	900
Leo V	903
Christopher	903
Sergius III	904
Anastasius III	911
Lando	913
John X	914
Leo VI	928
Stephen VIII	929
John XI	931
Leo VII	936
Stephen IX	939
Martin III., or Marinus II	943
Agapetus II	946
John XII. / Leo VIII.	956
Benedict V	964
John XIII	965
Benedict VI	972
Domnus II	974
Benedict VII	975
John XIV / Boniface VII.	983
John XV	985
Gregory V. / John XVI.	996
Sylvester II	999
John XVII	1003
John XVIII	1003
Sergius IV	1009
Benedict VIII. / Gregory VI.	1012
John XIX	1024
Benedict IX. / John XX.	1033
Gregory VI. / Sylvester III.	1045
Clement II	1046
Damasus II. / Benedict IX.	1048
St. Leo IX	1049
Victor II	1055
Stephen X	1057
Benedict X	1058
Nicholas II	1058
Alexander II. / Honorius II.	1061
Gregory VII. / Clement III	1073
Victor III	1086
Urban II	1088
Paschal II	1099
Gelasius II. / Gregory VIII.	1118
Calixtus II	1119
Honorius II. / Celestine II.	1124
Innocent II. / Anacletus II. / Victor IV.	1130
Celestinus II	1143
Lucius II	1144
Eugenius III	1145
Anastasius IV	1153
Adrian IV	1154
Alexander III. / Victor V. / Paschal III. / Calixtus III. / Innocent III.	1159
Lucius III	1181
Urban III	1185
Gregory VIII	1187
Clement III	1187
Celestinus III	1191
Innocent III	1198
Honorius III	1216
Gregory IX	1227
Celestinus IV	1241
Innocent IV	1243
Alexander IV	1254
Urban IV	1261
Clement IV	1265
Gregory X	1271
Innocent V	1276
Adrian V	1276
John XXI	1276
Nicholas III	1277
Martin IV	1281
Honorius IV	1285
Nicholas IV	1288
St. Celestinus V	1294
Boniface VIII	1294
Benedict XI	1303
Clement V	1305
John XXII	1316
Benedict XII. / Nicholas V.	1334
Clement VI	1342
Innocent VI	1352
Urban V. / Clement VII.	1362
Gregory XI	1370
Urban VI	1378
Boniface IX. / Benedict XIII	1389
Innocent VII	1404
Gregory XII	1406
Alexander V	1409
John XXIII	1410
Martin V / Clement VIII.	1417
Eugenius IV. / Felix V	1431
Nicholas V	1447
Calixtus III	1455
Pius II	1458
Paul II	1464
Sixtus IV	1471
Innocent VIII	1484
Alexander VI	1492
Pius III	1503
Julius II	1503
Leo X	1513
Adrian VI	1522
Clement VII	1523
Paul III	1534
Julius III	1550
Marcellus II	1555
Paul IV	1555
Pius IV	1559
St. Pius V	1566
Gregory XIII	1572
Sixtus V	1585
Urban VII	1590
Gregory XIV	1590
Innocent IX	1591
Clement VIII	1592
Leo XI	1605
Paul V	1605
Gregory XV	1621
Urban VIII	1623
Innocent X	1644
Alexander VII	1655
Clement IX	1667
Clement X	1670
Innocent XI	1676
Alexander VIII	1689
Innocent XII	1691
Clement XI	1700
Innocent XIII	1721
Benedict XIII	1724
Clement XII	1730
Benedict XIV	1740
Clement XIII	1750
Clement XIV	1769
Pius VI	1775
Pius VII	1800
Leo XII	1825
Pius VIII	1829
Gregory XVI	1831
Pius IX	1846
Leo XIII	1878
Pius X	1903

POPE, Alexander, noted poet, born in London, England, May 22, 1688; died May 30, 1744. He was the son of a Roman Catholic merchant, a man of considerable wealth, who resided in a rural home near Windsor the later part of his life. He engaged in study from an early age, and at twelve years wrote his "Ode to Solitude," a production noted for many thoughtful expressions. Later he was sent to school at Twyford and London, where he became a proficient scholar in Greek and Latin. His stature was so small that he needed a high-chair at the table, and his physical strength was greatly impaired, being unable to dress or undress himself much of the time. He roamed about the fields in his youth, that he might gain in physical strength, and thereby came in contact with the many scenes of nature, which enabled him to touch with powerful fancy and truth the lessons drawn from the "Iliad" and "Odyssey" of Homer. His "Essay on Criticism" was published in 1711, a work that placed him in high repute among the men of his time, and soon after appeared "Rape of the Lock," a masterpiece regarded the most beautiful of his writings. In 1733 he published his "Essay on Man," a work in four epistles; the first treating of man in his relation to the universe, the second in his relation to himself, the third in his relation to society, and the fourth deals with his ideas of happiness. Pope ranks among the poets who please the reader in conforming to the laws of rhythm, by studying the music of their song. He influenced remarkably the poetry of his own and succeeding generations, and many writers have strived vainly to equal him, though few have succeeded in expressing thought in the spirit of poetry with which he wrote. The most widely studied of his works were, perhaps, his translations of the "Odyssey" and the "Iliad" of Homer. They were his most profitable books, the latter yielding him $30,000. Other writings from his pen include "Temple of Fame;" "Windsor Forest;" "Dunciad;" "Moral Epistles;" "Epistle of Eloisa to Abelard;" "Elegy on an Unfortunate Lady;" "Verses to the Imitator of Horace," and "On the Use of Riches."



ALEXANDER POPE.

POPE, John, soldier, born in Louisville, Kentucky, March 16, 1822; died Sept. 23, 1892. He graduated from the United States Military Academy in 1842, and soon after secured an appointment as lieutenant of engineers in the United States army. While holding that position he served on the survey of Florida and the northwestern boundary, and in the Mexican War. He was promoted for efficient services at Monterey and Buena Vista to the rank of captain, and aided in making the government surveys in North Dakota and New Mexico until the beginning of the Civil War. In the early part of 1861 he became brigadier-general of volunteers, and in December of the same year defeated the Confederates under General Price at Blackwater, Missouri. The following spring he captured New Madrid in the same state, and Island No. 10 in the Mississippi River. He was soon after transferred to the east, where he was given command of the army of Virginia, which had been under Generals McDowell, Fremont, and Banks. They had been defeated by Stonewall Jackson, and after a vigorous campaign Pope was defeated on Aug. 29-30, 1862, in the second battle of Bull Run. At his own request he was transferred to the department of the northeast, and in 1865 to Missouri. Subsequent to the war he served in the department of the Pacific and resigned in 1886, having been made major-general in 1882. The failure of Pope's campaign resulting in his defeat at the battle of Bull Run was charged to the disobedience of Fitz-John Porter, who was court-martialed and dismissed from the army in 1863, but was restored in 1886. Pope died at the soldiers' and sailors' home at Sandusky, Ohio, where he was visiting. He is the author of "Explorations from the Red River to the Rio Grande" and "The Campaign of Virginia."

POPLAR (pŏp'lēr), a genus of deciduous trees, widely distributed in the north temperate zone, particularly in the temperate

POPLAR.
Leaves, Flower, and Catkins.

parts of North America and Eurasia. About twenty species have been described, fully half of them being native to North America. Most of the varieties are of rapid growth, producing timber that is light and easily worked, but not particularly valuable for durable qualities. However, the wood is used extensively for fuel, while the trees are among the most highly prized for orna-

mental and shade purposes. The leaves are alternate and have a more or less tremulous motion, and the flowers include both barren and fertile, growing in catkins. Among the most noted species are the aspens, cottonwood, and Lombardy poplar, these three being particularly peculiar for the tremulous motion of their leaves, which is due in part to the length and slenderness of the leafstalk, but mainly to its being flattened vertically. Other well known species include the Italian poplar, white poplar, gray poplar, balsam poplar, black poplar, and Ontario poplar.

POPLIN (pŏp'lĭn), a fabric of French origin, and first made at Avignon in the 15th century. The genuine article is a soft and elastic fabric, made by weaving a warp of

POPPY.
Flower and Capsule.

silk with a weft of worsted yarn. Imitations are now made by substituting cotton and flax for the silk. Protestant refugees introduced the manufacture of poplin into Ireland and England in the 17th century. It is made quite extensively in the United States at present.

POPOCATAPETL (pō-pō-kăt-ă-pă'tl), an active volcano of Mexico, situated forty-five miles southeast of the city of Mexico, in the state of Puebla. It has an elevation of 17,784 feet above sea-level. Its lower slopes have fine grasses and forests, but vegetation ceases at an altitude of 13,500 feet, and its peak is covered with perpetual snow. The crater is about 900 feet deep, measures three miles in circumference, and smoke issues from it at intervals, but no eruptions have occurred since 1540.

POPPY, a genus of plants, which are native chiefly to the warmer regions of Eurasia. They occur in many parts of Europe as weeds, but some species have been improved by propagation and are cultivated as ornamental plants and for the production of poppy oil and opium. The roots of the poppy are annual or perennial, the flowers showy, and the capsule contains a large number of seeds. The white poppy is the most valuable for opium. Poppy oil is pressed from the seed of both the white and black poppy. It is useful in artistic painting, and is sold as a food in the European market. Poppy oil cake is a wholesome stock food. The carnation poppy is a double-flowered variety, and is cultivated extensively in gardens and parks. See **Opium**.

POPULATION (pŏp-ū-lā'shŭn), the whole number of people in a place or a given territorial area, or the state of a country with respect to the number of its inhabitants. Every form of vegetable and animal life possesses an inherent power of propagation. This power may be said to be infinite, and, if all the conditions as to climate, space, and food were favorable—that is, if not interfered with by other organic beings or natural conditions—any given form of life would rapidly multiply until every region of the earth would be filled with it. It is apparent to anyone studying the subject of population that the power of increase is not limited by desire, since, if it were, the natural tendency of the species to favor a multiplication of their own kind would rapidly increase their number, perhaps to an extent equal to twice their aggregate in each generation.

Writers generally limit the power of increase to the means of subsistence, since all life forms are interfered with when attainable means to support life are inadequate. Viewed from this standpoint, it is apparent that population must actually increase beyond the means of subsistence before further increase is arrested by this limitation. Conditions of this kind have never arisen to limit the population of the earth as a whole, but in China and other countries of Eurasia they have prevailed to a greater or less extent, though emigration of large numbers has afforded relief in different periods of time. The excellent work of T. R. Malthus, entitled "Essay on the Principle of Population," published in 1798, places the ratio of increase in population on a geometrical basis, and limits the increase of means of subsistence to an arithmetical ratio. The sources of this writer are historical and statistical, and he draws conclusions from both in proof of the fact that human life has continually pressed upon the means of subsistence in all countries and in all climates where the populations have existed for long periods of time. Among the other checks pointed out by him are vice, misery, and moral restraint. Each of these has a more

or less marked effect in preventing possible births from taking place, and has a powerful influence in shortening human life.

The civilized nations of modern times secure an approximately accurate estimate of their respective populations by taking a census at regular intervals. It is usual to obtain more information than the bare fact of the number of persons in the nation. Such additional information is obtained as will supply a reasonably accurate knowledge of the age and vitality of individuals, their sex, and the relative conditions of the various industries, thus affording reliable intelligence as to the conditions under which the inhabitants may pursue their political life and thought. It cannot be said that a normal state has yet been reached in the population of the United States, since a large immigration is still coming to find homes under less crowded conditions. However, the births exceed the deaths annually; hence, there would be a perceptible increase in population even if the natural laws of migration were not operating to increase our number of inhabitants.

In Europe the number of females aggregate 1,055 to every 1,000 males, while in the United States the males exceed the females. The census of 1900 places the males at 39,059,242, or 51.2 per cent., and the females at 37,244,145, or 48.8 per cent. This difference is accounted for largely from the fact that more males emigrate from the European countries than females, thus increasing our male population more largely than the female, but the sexes are variously affected by social and industrial conditions. The general advancement of civilization has caused an increase in the duration of life by elevating the general standard of living; however, there is still great need of further development by providing better sanitary regulations, shelter, and purer food for a large per cent. of people. It is probable that judicious management would tend to largely increase the means of subsistence in many countries, and correspondingly open fields for the more wholesome support of a larger population. In the United States there is a continuous concentration of people in the cities. The urban population of this country in 1900 was 24,992,199, or 33.1 per cent. of the total population. In 1790 there were but six cities having more than 8,000 inhabitants, but in 1900 there were 545.

POPULATION, Center of, the locality constituting the center of population of a state or nation. The center of population of the United States has moved westward continuously since the first census was taken, in 1790, when it was twenty-three miles east of Baltimore. It was twenty-two miles west of Baltimore in 1800; forty miles northwest of Washington in 1810; sixteen miles north of Woodstock, Virginia, in 1820; nineteen miles southwest of Moorefield, West Virginia, in 1830; sixteen miles south of Clarksburg, West Virginia, in 1840; twenty-three miles southeast of Parkersburg, West Virginia, in 1850; twenty miles south of Chillicothe, Ohio, in 1860; forty-eight miles east of Cincinnati in 1870; eight miles southwest of Cincinnati (in Kentucky), in 1880; twenty miles east of Columbus, Indiana, in 1890; and six miles southeast of Columbus, Indiana, in 1900.

PORCELAIN (pôr'sĕ-lĭn). See **Pottery**.

PORCUPINE (pôr'kŭ-pīn), a rodent quadruped. It has coarse hair thickly interspersed with erectile quill-like spines, especially on the rump and tail, which it uses as a means of defense. The genus includes a large number of species, varying greatly in size and habits. The Canada porcupine is native to the temperate parts of North America. Its body is about two feet long, and weighs from twenty to thirty pounds. It has short quills concealed in the fur, small ears, and a comparatively short tail. The coendus porcupine is common to the warmer parts of America, and is remarkable for its prehensile tail, which it uses as an

PORCUPINE.

aid in crawling among the branches of trees. The crested porcupine is widely distributed in Eurasia and Africa. This species has a grizzled-black color, and is about the size of the North American porcupine. The spines lie flat and concealed until the animal becomes excited, when they assume an erect position. Most species of porcupines are torpid in winter and generally solitary in habits. They live mostly on fruit, roots, and other vegetable substances, for which they search at night, but lie concealed in their burrows during the day.

PORK, the flesh of swine, either fresh or salted. It is used as food. The pork obtained from young and properly fed animals is easily digested, and when occasionally eaten is highly wholesome. Its heat-giving qualities make it of especial value in temperate and cold climates, while its property of being capable of preservation by salting and drying renders it one of the most valuable meats in the market. No other animal food may be so easily preserved, hence it is prepared in vast quantities as food for home use and for the army and navy. The Mosaic law forbade the use of swine as food, and Jews still regard the animal unclean. Similar views are held by other peoples of Eurasia and Africa, and several

Christian sects in America. However, a large majority now regard pork as one of the most wholesome foods. Products derived from it enter to a very large extent into the foods of mankind.

POROSITY (pō-rŏs'ĭ-tў), the quality or property of possessing pores, and on account of which no kind of matter, whether solid or liquid, completely fills the space it occupies. A sponge illustrates pores on a large scale; so also do bread and many kinds of wood. However, the pores of some bodies are as completely invisible to the eye as the smallest atom. Pores are caused by the fact that the molecules of which a body is composed are not in actual contact, but are separated by minute spaces. This may be illustrated by adding a quantity of fine salt to a bowl full of water, which may be done without the liquid running over, but care must be exercised in giving the salt time to dissolve and the bubbles of air to pass off. Water may be forced under heavy pressure through metals, such as silver, iron, and steel. A test of this kind is applied to heavy cannon, the water being forced into the gun by hydrostatic pressure until it oozes through the thick metal and covers the outside of the gun like froth, and after gathering in drops, it runs to the ground in small streams. Porosity enters as a property of vast importance into natural phenomena, since water sinking into the earth, sap rising in vegetables, and other essential actions in nature are partly due to it.

PORPHYRY (pôr'fĭ-rў), the name applied originally to a rock having a purple-colored base, with inclosed individual crystals of a feldspar. The term now applies to any fine-grained rock containing distinct crystals of any mineral or minerals, and possessing the property of taking a fine polish. Thus, any rock in which crystals of feldspar are developed individually irrespective of the mineralogical composition of the whole is said to be porphyritic. Rocks of this character have been used for sculptures from remote antiquity, the ancients deriving their supply from an extensive deposit in Egypt, between the Red Sea and Siout, and from several regions of western Asia. Valuable deposits are abundant in Germany and Britain, the most noted being of a pale-red color with modifications of green, white, and black.

PORPOISE (pôr'pŭs), a sea mammal of the dolphin family, found extensively off the coasts of North America and Europe and in the Arctic regions. A full-grown common porpoise is about five feet long. The head is rounded in front, and the snout is not extended into a beak. Its external surface is hairless and shining, and its color pure white below and dark-gray or black on the upper parts. Porpoises are often seen in small herds along the coasts rather than in the open seas, though they often ascend rivers in pursuit of fishes, upon which they feed. They appear to be particularly fond of mackerel, herring, and salmon, and their teeth are well adapted to catch these fishes while pursuing them in schools. Formerly

PORPOISE.

they were esteemed as an article of food, and they are still eaten by the natives of the northern part of North America, but their only commercial value is derived from the oil obtained from their blubber and their skin; the latter is used for leather and shoelaces.

PORT ARTHUR, a town and naval station of China, in the province of Shing King, 275 miles east of Peking. It is strongly fortified, but was taken by the Japanese in 1894, who were obliged to return it to China at the instance of Russia in 1896. The Trans-Siberian railroad connects it with interior cities. It has an important navigation commerce, which is controlled by Russians and Chinese. Russia fortified and made it a naval station, but it was captured in 1905, after a siege, by the Japanese. Population, 31,500.

PORT-AU-PRINCE (pōrt-ō-prăns'), capital of the republic of Hayti, situated in the western part of the island of Hayti, on a bay of the same name. It has a beautiful site and is regularly platted, but has declined in importance since French occupation of the island ceased. The principal buildings are several government structures, a hospital, the mint, a lyceum, and the customhouse. It has a number of churches, several elementary schools, and a system of waterworks, but most of the public improvements made by the French are at present in a poor state of repair. The city has a considerable trade in coffee, mahogany and redwood, cocoanuts, and fruits. Population, 70,000.

PORTCULLIS (pôrt-kŭl'lĭs), a framework of strong bars of wood or iron. It is usually adjusted to slide vertically in grooves on either side of the portal of a fortified place, and so constructed that it may be quickly dropped to close the entrance in case of surprise. The lower ends were formerly supplied with sharp-pointed bars, which were intended to strike anyone attempting to enter. In the Middle Ages it was common to have one or more portcullises at the entrance of castles and retreats built to insure safety, and in some countries of

Eurasia they are still in use. The weight of many is so heavy that it is necessary to provide a powerful windlass to raise them.

PORT DARWIN, a seaport of Australia, located on the northern coast of South Australia. Near it is the city of Palmerston, which has telegraph and railroad facilities. Port Darwin has a considerable trade in lumber, live-stock, and fruits.

PORT ELIZABETH, an important seaport of South Africa, in Cape Colony, on the western shore of Algoa Bay. It is nicely located, has a number of excellent streets, and contains several substantial government buildings and other public institutions. Among the most noteworthy structures are a Roman Catholic cathedral, the Gray Institute Schools, several colleges and hospitals, and a number of fine churches. Among the municipal facilities are pavements, a public library, telephones, electric lighting, and public waterworks. It has a large trade in wool, feathers, skins, machinery, and utensils. Railroad and steamboat lines supply excellent commercial facilities. Population, 26,520.

PORTER, David, naval officer, born in Boston, Mass., Feb. 1, 1780; died in Constantinople, Turkey, March 3, 1843. He entered the navy as midshipman in 1798, became lieutenant the following year, and took part in the Tripolitan War in 1801-06. In 1812 he was appointed captain, and with the Essex captured a number of British prizes and the man-of-war Alert. He started on a cruise in the Pacific with the Essex in 1813, and there destroyed nearly the entire British whale fisheries, and took possession of the Marquesas Islands. On March 28, 1814, the Essex fought a desperate battle with the Phœbe and Cherub in the harbor of Valparaiso, in which the former was completely disabled and surrendered, and Porter returned home on parole. He was naval commissioner in 1815-23. The following year he fought against the West India pirates, and in 1825 was court-martialed and temporarily suspended from duty for requiring Porto Rican officers to apologize for detaining some of his men. In 1826 he resigned his commission to take charge of the navy of Mexico, but in 1829 returned to the United States and was appointed consul to Algeria. He became minister to Turkey in 1831, a position he held until his death. He published "Journal of the Cruise of the Essex" and "Constantinople and Its Environs."

PORTER, David Dixon, admiral, born in Chester, Penn., June 8, 1813; died in Washington, D. C., Feb. 13, 1891. He was a son of David Porter (q. v.), entered the navy in 1829 as midshipman, and was employed on the coast survey from 1836 to 1841. In the latter year he became lieutenant, and served at stations in the Mediterranean and Brazil till 1845, when he returned to the coast survey. He became commander of the Powhatan at the beginning of the Civil War, was employed for a time at Pensacola, and in 1862 bombarded Forts Jackson and St. Philip, aiding Farragut in the enterprise of taking New Orleans. In the same year he successfully passed the batteries of Vicksburg, where he operated actively in the siege, and the following year captured Arkansas Post. He was promoted to rear-admiral in 1863, took Grand Gulf, near Vicksburg, and cooperated with Grant in the reduction of that stronghold. In the following year he aided Banks in the Red River expedition, and was transferred to the North Atlantic squadron in December of the same year, when he made two powerful assaults on Fort Fisher, which he finally captured in January, 1865, with the aid of the military forces. He was promoted to the rank of vice-admiral in 1866, and was made admiral in 1870. Until 1869 he was superintendent of the Naval Academy at Annapolis, but in 1870 succeeded Farragut as admiral of the navy. He published "History of the Navy in the War of the Rebellion" and "Incidents and Anecdotes of the Civil War."

PORTER, Fitz-John, soldier, born in Portsmouth, New Hampshire, June 13, 1822; died May 21, 1901. Commodore David Porter was his uncle. He graduated from the West Point Military Academy in 1845, and immediately entered the Mexican War, serving throughout the contest. Besides taking part in the siege of Vera Cruz and the battles of Cerro Gordo and Chapultepec, he aided in the assault upon the city of Mexico. He was wounded in the latter, and soon after was made instructor at West Point. At the beginning of the Civil War he became colonel, was shortly after appointed brigadier-general, and was assigned by General McClellan to a command in the army of the Potomac. After taking part in the Peninsular campaign in 1862, he superintended the siege of Yorktown, and was attached to General Pope's army of Virginia in his campaign against Lee and Jackson. Porter and his corps were present at the second battle of Bull Run, Aug. 29-30, 1862, and in the afternoon of the first day of the battle he was ordered to attack Jackson, but this he disregarded. His conduct became the subject of a long controversy, and Pope charged him with being the cause of the defeat of the Union army. His defense was that the order of attack came so late in the afternoon that he thought it advisable not to make an assault, since he regarded an overwhelming defeat inevitable on account of superior opposing forces, thus exercising only the discretion commonly vested in subordinate commanders. However, he was court-martialed and deprived of his command. For more than twenty years the justice of this sentence was a subject of general discussion. He was restored to the rank of colonel in 1886, and placed on the retired list at his own request. From 1884 to 1888 he served as police commissioner in New York.

PORTER, Jane, novelist, born in Durham, England, in 1776; died in Bristol, May 24, 1850. She was a sister of Sir Robert Ker Porter, studied in Edinburgh and London, and in 1803 acquired general popularity by publishing "Thaddeus of Warsaw," an interesting romance. The "Scottish Chiefs" followed seven years later. This work is an interesting production in the field of historical novels, and the theme was treated more extensively by Sir Walter Scott. Other works from her pen include "Tales Round a Winter's Hearth;" "Pastor's Fireside," and "Field of Forty Footsteps."

PORTER, Noah, educator and author, born in Farmington, Conn., Dec. 14, 1811; died at New Haven, March 4, 1892. He graduated from Yale University in 1831, and engaged in the teacher's profession. In 1831-33 he taught in the Hopkins grammar school at New Haven, was tutor at Yale in 1833-35, and pursued theological studies during the same time. After admission to the ministry of the Congregational Church, he became pastor in New Milford, Conn., in 1836, and in 1843 was called to a charge in Springfield, Mass. He was elected professor of metaphysics and moral philosophy at Yale University in 1846, a position which he filled twenty-five years. In 1871 he became president of the same institution, but resigned in 1885, though he continued his professorship until his death. Among his many writings are "Books and Reading;" "Human Intellect;" "Science of Nature Versus the Science of Man;" "American Colleges and the American Public," and "Elements of Moral Science." He edited the revised editions of "Webster's Dictionary" of 1864, 1880, and 1890.

PORT HURON, a city of Michigan, in St. Clair county, on St. Clair River, sixty miles northeast of Detroit. It has excellent railroad facilities, ship-yards, dry-docks, a customhouse, and extensive grain elevators. Among the manufactures are flour, carriages and wagons, tobacco and cigars, marble products, engines, ironware, farming implements, machinery, and earthenware. The city is supplied with electric lights and street railways, city waterworks, excellent public schools, street pavements, and other municipal facilities. It is connected by a railway tunnel under the St. Clair River with Sarnia, in Canada, and there is a large trade by steamboats with all the principal lake ports. Population, 1904, 20,028.

PORT JERVIS (jĕr'vĭs), a town of Orange county, New York, on the Delaware River, sixty miles northwest of New York City. It is conveniently connected with New York and other cities by railways, has modern municipal facilities, and is surrounded by a fertile farming and dairying country. The manufactures include boots and shoes, glass, machinery, gloves, and watch-cases. It was named after John B. Jervis, an engineer of the Delaware and Hudson Canal. This canal connects the Pennsylvania coal fields with the Hudson River. Population, 1900, 9,385.

PORTLAND, a port of entry in Maine, county seat of Cumberland county, on Casco Bay, 105 miles northeast of Boston. It is the largest city of the state and the chief railroad center of Maine. Its harbor is sufficiently deep for the largest vessels, and is defended by three forts. The city has an extensive foreign trade with American and European ports and the West Indies. The exports and imports aggregate annually about $13,500,000 each. Among the chief manufactures are textiles, ironware, canned goods, furniture, leather, farming implements, matches, clothing, earthenware, sugar, machinery, and boots and shoes. The principal buildings are the customhouse, a Roman Catholic cathedral, the Maine general hospital, several excellent public schools, and numerous churches and educational institutions. It has a number of excellent promenades and public parks, fine libraries with about 75,000 volumes, and several scientific and educational institutes and associations. The city is improved by electric and gas lights, street railways, a sewer system, street pavements, and other municipal facilities. In the vicinity are extensive deposits of marble and clay. Portland dates from 1786, but the first European settlement was made there in 1632, the village built on its site being long known as Falmouth. A destructive fire caused a loss of about $10,000,000 worth of property in 1866. Among the eminent Americans born in Portland are Henry W. Longfellow, Neal Dow, Sarah P. Parton, and Erastus Brooks. Population, 1900, 50,145.

PORTLAND, the largest city of Oregon, county seat of Multnomah county, on the Willamette River, about one hundred miles from the ocean. It is finely located at the head of water navigation, has convenient railroad facilities, and is surrounded by a fertile agricultural, fruit-growing, and stock-raising country. The most important buildings include the Bishop Scott Academy, union depot, city hall, chamber of commerce, Portland University, St. Michael's Academy, St. Helen's Hall, Portland Academy, and a number of excellent public schools and churches. It is the seat of the law department of the University of Oregon and of the medical department of the Willamette University. The city has several libraries, well paved streets, electric lights and street railways, and public waterworks. It is in every way beautified by modern improvements. Among the manufactures are carriages and wagons, furniture, lumber products, woolen goods, paper, iron and hardware, paints and oils, pottery, leather, engines and boilers, farming implements, and earthenware. The number of manufacturing establishments is about 650. They employ 10,500 persons, and turn out pro-

ducts annually valued at about $30,000,000. The customhouse maintained by the government credits Portland with a large foreign trade, and it is an important distributing point for domestic products. It ranks as the metropolis of the state, commercially and educationally, and is the seat of a number of important associations and periodicals. The city was founded in 1844 and was incorporated as a city in 1851. It ranks as the forty-second city of the United States. Population, 1900, 90,426.

PORTLAND, Isle of, a rocky peninsula of Dorsetshire, England, in the English Channel, supposed to have been an island in former times. A ridge of shingle called the Chesil Bank connects it with the mainland. The island is about five miles long, two miles wide, and is formed largely of Portland stone. About 1,500 convicts are kept on the island by the British government, in the convict prison, a massive structure on the top of a hill, and these are employed in working the stone for exportation. Most of the coast line is precipitous, and there is but one landing place for vessels, this being on the north side. Several lighthouses are in the vicinity, and a breakwater built of stones provides safe refuge for hundreds of the largest ships. With the harbor are connected a naval station and batteries. The southern point of the island is called the Bill of Portland, and between it and the Shambles, three miles to the southeast, is a dangerous surf called the Race of Portland. The island has excellent water and is noted for the production of sheep, which yield the famous Portland mutton. It has a population of 11,146.

PORTLAND CEMENT. See **Cement.**

PORTLAND VASE, a beautiful cinerary urn, which was found in the Monte del Grano, near Rome, in the 16th century. It is made of transparent, dark-blue glass, has a height of ten inches, and is regarded the finest specimen of cameo cut-glass preserved from ancient times. This vase was deposited in the Barberini palace at Rome till 1770, when it was purchased by Sir William Hamilton, from whose possession it passed to the duchess of Portland. The duke of Portland placed it in the British Museum in 1810, where it was willfully broken by a miscreant in 1845, but soon after the fragments were skillfully reunited in a complete manner.

PORT LOUIS, the capital of the island of Mauritius, in the Indian Ocean, east of Madagascar. Port Louis is the principal seaport of the British colony of Mauritius. It is situated on the northwestern coast, where it has a fine site on a gradually sloping elevation averaging about 2,000 feet above sea-level. It is a British coaling station, has a number of barracks, military stores, hospitals, and a botanic garden. The streets are narrow, but they are regularly platted, and are improved by pavements, avenues of trees, electric lighting, street railways, and waterworks. There is a considerable trade in fruits, wool, clothing, and utensils. Population, 72,385.

PORT OF SPAIN, a city on the island of Trinidad, situated near the western coast. It is connected with the interior by a railway line, and its harbor is sufficiently deep only for the smaller vessels, goods being landed from the larger ships by flat-boats and from a pier. The city is well platted and built. It has several excellent government houses, two cathedrals, a theater, barracks, and a number of educational institutions. Its trade is quite important, especially in tropical fruits, coffee, tobacco, lumber, and cereals. Population, 35,220.

PORTO RICO (pōr'tō rē'kō), or **Puerto Rico**, an island of the West Indies, fourth in size of the Antilles, located east of Hayti, from which it is separated by Mona Passage. The United States government report of 1899 places the area at 3,606 square miles, which is about the same in extent as the states of Delaware and Rhode Island. It is traversed from east to west by a range of mountains, which includes about nine-tenths of the surface, reaching its highest altitude at the western extremity in El Yunque, whose highest summit is 3,790 feet above sea-level. The lowlands are mostly along the coasts, though there are many extensive valleys. Its climate is healthful, the temperature ranging from 70° to 82°, and the rainfall is about sixty inches. The island is well wooded and abundantly watered, and the soil is very fertile. It has no lakes, but a large number of rivers supply drainage. Among the more important streams are the Anasco, Tanama, Manati, Rio de la Plata, Bayamon, and Loiza. The mineral products are extensive, including salt, gold, copper, iron, amber, lignite, marble, limestone, and carbonates.

Agriculture and lumbering are the principal occupations. The soil products include coffee, cotton, sugar, tobacco, maize, pineapples, bananas, and many other tropical fruits. Valuable forests abound in all the hills and mountains, and extensive tracts prevail also in some regions near the coast. The different varieties of timber include mahogany, tree ferns, and other woods native to the West Indies. The exports and imports aggregate about $10,500,000 annually, the former including principally coffee, sugar, tobacco, and fruits; while the latter embrace petroleum, textiles, ironware, dried and salted meats, rice, and dairy products. The domestic animals are horses, mules, cattle, sheep, swine, and poultry. Manufacturers are increasing their output, the most important products being sugar, rum, tobacco and cigars, molasses, cotton and woolen goods, and lumber products.

Porto Rico was discovered by Columbus in 1493, and settlements were first made in 1510 by the Spaniards, who employed the natives as slaves. It continued under Span-

ish rule with varying success until 1898, when it was ceded to the United States as a result of the Spanish-American War. At the time the island was ceded to the United States, education was in a very backward state, fully 77.3 per cent. of the population being illiterate. Roman Catholic was the established religion and the priests were supported by taxation. The United States government immediately established a system of free education for the people, and at present there are schools in practically all parts of the island, with articulated higher institutions in the towns and cities. Religious worship is alike free to all classes, the general laws of the United States applying in that respect, and no sect has any privileges not extended to all. With the introduction of modern methods of managing the industries and the building of railway lines, rapid advancement resulted to the inhabitants, and the industries are now in a state of modern development.

At present Porto Rico has about 350 miles of railways, and extensive telephone and telegraph connections. Many of the cities are supplied with modern municipal facilities, such as waterworks, electric lighting, and sewerage. The coast line is 360 miles in extent, which greatly facilitates transportation, and there are many extensive improvements in the way of harbors and canals. The island is divided into political divisions called departments, which correspond to counties in the United States. The area, population, and density of population are given in the table below:

DEPARTMENT.	AREA IN SQUARE MILES.	POPULATION.	PERSONS TO A SQUARE MILE.
Guayama	561	111,986	200
Humacao	413	88,501	214
Ponce	822	203,191	247
Arecibo	621	162,308	261
Bayamon	542	160,046	295
Mayaguez	407	127,566	313
Aguadilla	240	99,645	415
Porto Rico	3,606	953,243	264

The government of Porto Rico is under a resident governor, who is appointed by the president with consent of the senate. Other civil officers are appointed by the president, or are provided for by act of congress. Charles H. Allen (born in 1848) became the first governor on May 1, 1900. San Juan, situated on an island separated from Porto Rico proper by San Antonio Channel, is the capital. Other important cities are Yauco, San German, Mayaguez, Bayamon, Santa Isabel, Aguadilla, Arecibo, Ponce, and Guayama. In 1765 the population was 44,883; in 1860, 583,308, and in 1899, 953,243. This includes 75 Chinese and 59,380 Negroes. The total white population is given at 589,426, and the others are classed as belonging to colored or mixed races.

PORT SAID (pōrt sä-ēd), a seaport of Egypt, located on the Mediterranean Sea, immediately west of the Suez Canal. Its site is on a narrow strip of land that is separated from the Mediterranean by Lake Menzaleh. The streets are regularly platted, intersecting each other at right angles. Some of the business blocks and private residences are substantial, but its growth is limited because of an inadequate water supply and the barren nature of the desolate strip of land on which it is located. Port Said owes its existence to the Suez Canal. It was founded in 1859 and was so named from the patron of the enterprise, Said Pasha. It has a considerable canal and sea trade, and is important as a coaling station. Population, 42,500.

PORTSMOUTH (pōrts'mŭth), a city of Rockingham county, New Hampshire, on the Piscataqua River. It has a fine harbor, extensive railroad facilities, and enjoys a growing export and import trade. The city contains many buildings that date from colonial times, some of them quaint and old-fashioned, but the streets are beautified with avenues of trees, and it is a favorite summer visiting resort. Among the conspicuous improvements are a fine balance dry-dock, a United States navy yard, and excellent church and public school buildings. It is the seat of several educational institutions. Portsmouth has substantial street pavements, public lighting, and a number of libraries that include about 50,000 volumes. The manufactures embrace cotton and woolen goods, boots and shoes, machinery, and ships. It was incorporated as a town in 1633. Population, 1900, 10,637.

PORTSMOUTH, a city in Ohio, county seat of Scioto county, at the confluence of the Scioto with the Ohio River, and at the southern terminus of the Ohio and Erie Canal. It has important railroad facilities, finely paved streets, electric lights and street railways, several libraries, and public waterworks. The most notable buildings are a children's home, a home for destitute aged women, the Masonic Temple, the opera house, and a number of excellent schools and churches. The county courthouse is a modern structure. Among the manufactures are furniture, hardware, steel springs, boots and shoes, vehicles, and earthenware. The surrounding country is farming and dairying, producing cereals, fruits, and dairy products. It contains rich iron ore deposits. Population, 1900, 17,870.

PORTSMOUTH, a city of Virginia, county seat of Norfolk county, on the west side of Elizabeth River, opposite Norfolk. It has good railway facilities, an excellent harbor, and enjoys a large export trade in lumber, cotton, tobacco, pig-iron, and vegetables. Among the manufactures are sailing-vessels, machinery, flour, lumber products, and utensils. Its public buildings include a fine courthouse. It is the seat of

the United States Gosport navy yard, and has good public schools. Electric lights, substantial pavements, waterworks, and street railways are among the improvements. Several important railroad shops are located there. Population, 1900, 17,427.

PORTSMOUTH, a seaport of England, situated on Portsea Island, opposite the Isle of Wight, about seventy miles southwest of London. It is the principal naval station of England, has railway connections with its suburb, Portsea, and is connected with Gosport, a city opposite the entrance to Portsmouth harbor, with a steam bridge. The defenses of Portsmouth are extensive and systematically built. They include on the landward side the Hilsea lines and the Portsdown forts, and to the seaward the forts of Spithead. The harbor is only 400 yards wide at its entrance, but it gradually expands into a large and deep basin, and extends inland more than four miles, where it assumes a breadth of three miles. Its manufactures are of little consequence, but there is an extensive export and import trade. Coal, corn, cattle, sheep, timber, and machinery are the principal articles of commerce. Portsmouth was first established as a port by Henry VIII., but was strengthened by Elizabeth and afterward by Edward III. The city is surrounded by a large number of suburban villages and towns, all of which are supplied with municipal facilities. They have substantial school and church buildings, and a number of them rank as favorite summer resorts. The entire population is 189,160.

PORTUGAL (pōr'tū-gal), a kingdom of western Europe, occupying the southwestern part of the Iberian peninsula. It extends 345 miles along the Atlantic coast and 145 miles inland, and has an area of 34,462 square miles, but with its dependencies, the Azores and Madeiras, it embraces 35,698 square miles. The seven provinces of Portugal proper are Algarve, Beira Baixa, Minho, Beira Alta, Alemtejo, Estremadura, and Trazos Montes. Its colonial possessions have an area of about 710,000 square miles. They embrace principally the African regions of Angola, Mozambique, and Guinea; the islands of St. Thomas and Cape Verde; the Prince's Islands; and the Asiatic possessions of Macao, Damaun, Diu, Goa, Salsette, and the Indian Archipelago. The area of Portugal and its colonies is estimated at 750,000 square miles, and the entire population is about 10,500,000, while the population of Portugal proper is 5,095,500. Lisbon is the capital. Other cities include Braga, Oporto, Setubal, and Evora.

The surface of Portugal is diversified by a chain of mountains that traverses from the southwest to the northeast, the most important range including the Sierra de Estrella, which is a chain of the Sierra Gaudarrama of Spain. The highest peaks tower 7,500 feet above sea-level, and the mountains are generally composed of granite formations. It has an abundance of drainage toward the west and south. The principal streams are the Minho, Douro, Tagus, and Sadao rivers, all of which flow toward the west into the Atlantic, while the Guadiana is the only considerable river flowing southward. Much of the coast is low, but in many places it rises abruptly from the sea, and there are numerous important and convenient harbors. The climate is modified by oceanic breezes on acount of proximity to the sea, and by the elevations in several parts, thus having a diversified effect upon vegetation and the industries.

In the southern part of Portugal spring begins early in January and vegetation grows abundantly in February. Most of the crops are harvested by mid-summer. This is followed by a season of general drought until in September, when rains begin to fall and continue at varying intervals until the following year. Snow remains the greater part of the year on the mountains of the northern part, where the summer season is shorter, though the dry part of the year is less extended. Portugal has an extensive flora, and its soil is noted for general fertility, but agriculture is not materially advanced, and only half of the productive soil may be said to be tilled profitably. Fine forests are abundant, both in the mountains and lowlands, including the cork-oak, common oak, date, aloes, mulberry, and other species of valuable woods. Vine culture is an important industry, and yields a fine quality of products, thus accounting for the large manufacture and export of wine. Large quantities of silk are manufactured. The silkworm is grown with more than ordinary care and success, and the mulberry tree peculiar to Portugal affords an excellent quality of food for its maintenance. Among the chief minerals are lead, gold, antimony, marble, coal, copper, slate, salt, iron, and limestone. However, mining is still in its infancy.

Agriculturists cultivate a superior grade of cereals, but the production does not meet the demand of home consumption. Stock-raising, like farming, has made little progress since ancient times, and the grades of cattle, horses, swine, mules, goats, sheep, and poultry have not been improved materially by propagation. Its fisheries are important and yield large quantities of marketable products; the anchovy and tunny fisheries of Algarve are the most important. The manufacturers have kept pace with the agriculturists and mine operators, and their enterprises are practically in the same condition, making little progress in the application of modern machinery. Repeated efforts have been made to utilize the natural resources more extensively and to place the manufacturing interests upon an improved basis, but little progress has been made. At present the most important products are

cotton and woolen goods, silk textiles, paper, soap, boots and shoes, wine, porcelain, ironware, furniture, salt, leather, and machinery. Within recent years the government has given encouragement to railroad building and other enterprises, and it is possible that the establishment of a popular educational system will within a comparatively short time place the country on a more progressive basis.

The government of Portugal is a limited monarchy, and is administered under a constitution. The crown is hereditary in the male and female lines, but males of equal birthright are given preference. Four functions, known as the legislative, executive, judicial, and moderative authority, are vested in the state. However, the moderative function is exercised by the sovereign. The two chambers are known as the house of peers and the house of commons. They constitute the cortes. The upper house is constituted of ninety members appointed by the crown for life, and in the lower house are 120 deputies, who are elected by universal suffrage. Six of the deputies are chosen by the colonies. The deputies are elected for a term of four years, and the conditions of eligibility include competency to read and write, an age of twenty-one years, and the possession of taxable property amounting to $540, though no property qualification is required of persons belonging to the learned professions.

Portugal has supported a system of public instruction for many years, but its present institutions of this character are governed by the law of 1844, which makes attendance at school compulsory from the age of seven to fifteen years, provided a school is within a mile. This law is generally enforced where schools are maintained, but elementary schools are limited in number, though secondary schools are abundant and carry efficient courses of study. The higher system of education includes seventeen lycees, from which students may pass to special schools or to the University of Coimbra. This institution as a university dates from 1300, and has an attendance of about 1,500 students. The religion is almost exclusively Roman Catholic, but Protestant places of worship are tolerated at Lisbon, Oporto, and other cities. In 1834 the monasteries were closed, though convents for nuns still exist. As a whole, the educational status is inferior to that of other European countries. The standing army has a strength of 34,500 men of all ranks, while the war footing is 150,000 men. The navy has only a few good vessels, but it includes thirty-five steamers, fifteen sailing vessels, and several training ships. However, there is a commercial navy of some importance, which is made up of seventy steamers and 485 sailing vessels. The army maintained in the foreign colonies aggregates 9,250 officers and men, besides native troops. Portugal proper has 2,350 miles of railroads and 12,000 miles of telegraph lines, and there are similar improvements in the colonies.

The earliest history of Portugal has come to us from the Phœnicians, Greeks, and Carthaginians, who traded along its coasts and established colonies in various parts of the Iberian peninsula. Its ancient name was Lusitania, and the original inhabitants were known as Lusitanians. The region was conquered by the Romans and was held as a dependency for many centuries, but after the decline of Rome it was successively overrun by the Alans, Goths, and Vandals, and in the 8th century the Moors conquered it and introduced their form of civilization. For nearly 400 years the Moors remained the predominating influence, but they were finally conquered in 1139, and Alfonso I. organized an independent kingdom in 1143. The country at first included only the region between the Minho and Douro, but Alfonso enlarged the border by defeating the king of Castile, and thereby extended his dominion beyond the Tagus. In 1143 he annexed Algarve and Sanarem. Lisbon was captured by the aid of the Crusaders in 1147, an event counted among the most notable of the brilliant achievements of the reign of Alfonso.

In the period included between the latter part of the 14th and the former part of the 16th centuries Portugal ranked as one of the greatest countries of Europe. Its proud position among the nations was attained in the successful reign of King John I. and that of his son, Prince Henry the Navigator. It was during this period that Portugal obtained a code of laws and a constitution; industrial arts were encouraged, and a great navy was established. Many colleges and institutions of learning were founded, and all were liberally patronized. The fleet of Portugal sailed upon all the seas known at that time, Lisbon became the most noted commercial center for Eastern products, and the navigators discovered and explored many parts of Africa and the South Sea Islands. In 1487 Bartolommeo Diaz doubled the Cape of Good Hope; India was reached by Vasco da Gama in 1498, and Brazil was claimed for the crown by Cabral in 1500. The Spanish explorers were active at the same time. The jealousies that arose between the two nations led to continuous quarrel, and in 1580 Philip II. of Spain gained the victory of Alcantara and annexed Portugal to his kingdom.

The Portuguese were greatly discontented under Spanish dominion, and they made strenuous efforts to regain their independence, but did not finally succeed until 1640. The Spanish government did not recognize their country as an independent nation until 1668. While Portugal and Spain were at war, the Dutch were led by hostile measures of Philip to make continuous attacks upon the colonial possessions of both countries. During this period Portugal lost

the Moluccas and its settlements in Malacca, Guinea, Ceylon, and a portion of Brazil, but the last named was afterward restored to Portugal by purchase. At that time Portugal lost its proud position as one of the great maritime powers of Europe, while its finances were almost ruined and the people sunk into ignorance and bigotry. Joseph I. succeeded to the throne in 1750 and placed the marquis of Pombal at the head of affairs as minister. The latter sought to restore national credit and former prosperity by making many excellent reforms, but the affairs of the nation passed to the eldest daughter of Joseph, Maria Isabella, in 1777, who governed with inefficiency until in 1792, when it became necessary to make her eldest son John, prince of Brazil, regent of the nation. The friendly relations maintained between Portugal and England caused Napoleon to design the extinction of the reigning dynasty, and after a French force under Junot occupied Portugal, the royal family transferred the seat of government to Rio de Janeiro, Brazil, in 1807.

John VI. ascended the throne of Portugal and Brazil on the death of Maria in 1816, but he continued to reside in the latter country. The nation viewed with dislike the absence of the royal family, since the government at home was mismanaged by its officers. In 1820 a revolution caused the establishment of a constitution, but the king was invited to return, which he did soon after. Brazil declared its independence from Portugal in 1822, and proclaimed the son of John VI., Dom Pedro, as emperor. King John died in 1826, and the emperor of Brazil became Dom Pedro IV. of Portugal, but the government was administered under Infanta Isabella Maria as regent. A constitution modeled after that of France was adopted in 1826, and Dom Pedro at once abdicated the throne of Portugal in favor of his daughter, Maria da Gloria, with the condition that she should marry Dom Miguel, who was named as regent. A revolution in favor of the latter caused him to be declared king by the cortes, but Dom Pedro resigned as emperor of Brazil in 1831 and returned to Europe for the purpose of overthrowing Dom Miguel, and succeeded in restoring Maria in 1833. She governed until her death in 1853, when her son, Dom Pedro V., became king under the regency of her husband, Ferdinand Saxe-Coburg. He succeeded to full government in 1855, but died in 1861, and was succeeded by his brother, Louis I. The latter died in 1889, and the sovereignty passed to his son. Carlos I., under whose reign the country has enjoyed considerable prosperity and progress. It has been the policy of the government to encourage all forms of industry, extend railroad building, and enlarge maritime and colonial influences.

The Portuguese language is spoken in Portugal and Brazil, and resembles the Spanish in some respects, while its pronunciation is somewhat similar to French. The languages spoken in Portugal and Spain up to the time of Alfonso I. were very similar, but at that time the Castilian dialect became the language of Spain, and the Galacian dialect quite largely influenced the language of Portugal. The difference in language was one of the causes of hostility between the two countries, and each developed a distinct spoken and written form. Portuguese is more flexible than Spanish, but the latter is regarded more polite and dignified. Many excellent literary productions have been written in the language of Portugal. The earliest writings date from the 13th century, and are constituted of collections of poetry made by King Dionysius. Pedro I. was among the early poets, while the sons and grandsons of John I. produced a number of poetical works of value. Fernan Lopes (1380-1459) published "The History of Portugal" in 1425, and Antonio de Ferreira wrote "Ignez de Castro," an excellent tragedy, about 1560. In that period the Portuguese dialect was separated from other dialects spoken in the Iberian peninusla, and national pride was aroused by vast explorations in foreign lands, thus giving poets inspiration to laud Portuguese heroes and touch the spirit of nationality.

Among the great writers of the 16th century who wrote much of the classic literature of Portugal may be included Ferreira, Miranda, Bernardes, Oriente, and Camoens, the last named being the author of dramas, sonnets, songs, and a work of great value, entitled "Os Lusiadas." De Barros is the eminent historian of the 16th century and the author of "Conquest of the Indies," while his contemporary, Brandao, wrote "The History of the Lusitanian Monarchy." The writers of the 17th and 18th centuries were influenced by French scholars, and in the time of Louis XIV. became quite imitative. Interest in literature was greatly augmented in the early part of the 19th century by the writings of Barbosa du Bocage and Manoel de Nascimento, both of whom are founders of distinct schools of poetry, the former of an affected style of sonnets, and the latter of elegant lyrics. Herculano de Carvalho is the most noted modern historian of Portugal. Other recent writers are Garrett, Ribeiro, Diniz, Silva, Castilho, and Mouzinho de Albuquerque. Brazil has furnished many excellent productions, and within recent years there has been a marked rise in literary vigor, due principally to the establishment of schools on a freer and better basis. Portuguese art is not particularly noted.

PORTUGUESE WEST AFRICA. See Angola.

PORT WINE, a product from grapes. It was made originally in the valley of the Douro, Portugal, and was so named from Oporto, whence it is exported in large quantities. Port wine has a color varying from

pink to red, is slightly astringent, and requires about three years to mature. The annual production in Portugal is estimated at 115,000 pipes, and about one-third of this is exported. Several artificial grades are made in the United States.

POSEIDON (pō-sī'dōn), the god of the sea mentioned in Greek legends. He is regarded the son of Kronos and Rhea, and

POSEIDON.

the brother of Zeus and Pluto. His power was surpassed only by Zeus, and he presided particularly over the Mediterranean, and, like the element over which he presided, he had a very variable disposition, sometimes calm and placid and at other times violently agitated. It is due to this characteristic that he is represented by some poets as composed, while others describe him as disturbed and angry. The fisherman's fork or trident was the symbol of his power. By means of it he produced earthquakes, raised up islands from the bottom of the sea, and caused wells to spring forth from the bottom of the earth. He was the constant friend of the Greeks in the Trojan War, but, after its termination, thwarted Ulysses on his return home for having killed Polyphemus, an heir of the god. Poseidon was worshiped with much devotion in the maritime towns, and the Isthmian games were dedicated to him. In modern Greece St. Nicholas holds the place of Poseidon as patron of sailors. See **Neptune**.

POSEN (pō'zĕn), a province of Germany, which is bounded on the north by West Prussia, east by Russian Poland, south by Silesia, and west by Brandenburg. Its surface is an undulating plain of great fertility, and the principal drainage is by the Warthe and the Netze. The Vistula forms a part of its northeastern boundary. About twenty per cent. of the surface is covered with forests, and sixty per cent. is under cultivation. The principal crops are wheat, rye, hops, potatoes, flax, tobacco, and fruits. Stock-raising is an important industry, and so also are dairying, manufacturing, and silk culture. The region included in Posen belonged to Poland till 1772, when it became a part of Prussia and Austria, though a portion of it was not incorporated with Prussia until 1793. Posen formed a part of the duchy of Warsaw from 1807 till 1815, but in the latter year it was again annexed to Prussia as the grand-duchy of Posen. The Polish part of the inhabitants took sides against Prussia in the Revolution of 1848. Posen has an area of 11,178 square miles, and is divided into the governments of Posen and Bromberg. Population, 1,950,000.

POSEN, a city of Germany, in the province of Posen, on the Wartha River, 145 miles east of Berlin. It is conveniently situated, has strong fortifications, and is a noted railroad and manufacturing center. Among the principal buildings are a splendid cathedral, the government buildings, numerous churches, several hospitals, and a number of gymnasia and institutions of higher learning. The manufactures include leather, cotton and woolen goods, silk textiles, tobacco products, carriages and wagons, sugar, musical and scientific instruments, and machinery. Electric lighting, street railways, several parks, and a public library of 25,000 volumes are among the general facilities. Posen was a member of the Hanseatic League in the Middle Ages, and long had importance as a trading center between western Europe and the regions on the boundary of Asia. It was the residence of the monarchs of Poland until the end of the 13th century. Its fortifications were built in 1828, and its modern prosperity dates from the building of railroads. Population, 71,415.

POST OFFICE, the branch of the civil service of a government which is charged with carrying and delivering the mails. It is certain that systems for conveying intelligence among individuals and between individuals and officials were maintained in times of remote antiquity, but the first systematic institution having charge of dispatches was established by the Roman Empire, though the business transacted was wholly of a public character. The places at intervals along the roads of Rome, where couriers were stationed to bear dispatches, gave rise to the word posts, a term now generally applied in different relations by the various nations in connection with their postal systems. The Hanseatic League of European cities established the first extensive system of carrying letters and parcels in the 13th century. A Boston business house in 1639 organized the first postal service in America by arranging to care for letters and periodicals to be sent to or received from foreign

countries. The New York colony established a postal line in 1672 between New York and Boston, and the stage carrying the mail made a round trip each month, but in 1702 the round trips were changed to twice a month. King William and Queen Mary granted a patent to Thomas Neale, in 1692, whereby he was made postmaster-general for the colonies. In the same year a general post office was established in Virginia, and the next year one was founded at Philadelphia. Parliament established a uniform postal system for all the colonies in 1710, and the principal office in America was located at New York, but there were general post offices to receive and distribute mails for different points in other large cities. Benjamin Franklin was the first postmaster-general to make the system a success, receiving his appointment in 1753, but he was deprived of his office in 1774 for his attitude in the American conflict.

In 1775 congress adopted a plan for a colonial system devised by William Goddard, and made Franklin the postmaster-general. Both the articles of confederation and the constitution vested the power over postal affairs in congress, and that body came in full control under the new federal government in 1789. At that time there were only about seventy-five offices in the thirteen states, but the business was continued with little substantial change until 1840, when the plan to make the post office system only expense-paying originated. Among the notable events in connection with the postal service of the United States are a postal treaty with England in 1846, improvements in postage stamps in 1847, introduction of stamped envelopes in 1852, the establishment of the registered letter system in 1855, the introduction of free delivery in 1863, the establishment of the money order system in 1864, the introduction of postal cards in 1873, the establishment of a special delivery system in 1885, the introduction of the two-cent reply postal card in 1892, and the revision of the postal money orders in 1900. Postal notes were first issued in 1883, but the law of 1900 made them payable to the bearer at any post office having the right of issue.

The growth and importance of the post office system of the United States may be noted from the following table:

YEAR.	NO. POST OFFICES.	REVENUE.	EXPENDITURES.
1790	75	$ 37,935	$ 32,140
1800	903	280,804	213,994
1810	2,300	552,366	495,969
1820	4,500	1,111,927	1,160,926
1830	8,450	1,850,583	1,932,708
1840	13,468	4,543,522	4,718,236
1850	18,417	5,552,971	5,212,953
1860	28,498	8,518,067	19,170,610
1870	38,492	19,772,221	23,998,837
1880	42,989	33,315,479	36,542,804
1890	62,401	60,858,783	66,645,083
1900	72,280	102,354,579	107,740,267

It is the policy of the government to make the postal system practically self-supporting, but the expenditures have exceeded the receipts much of the time. In 1900 the deficit was $5,385,688.70. This is due in a large extent to improvements effected in the service, such as rapid transit of the mails, free distribution to a large per cent. of the people, and encouragement given to educational arts by reducing or remitting entirely the postage on certain classes of periodicals. A large volume of mail is conveyed without the payment of postage, such as the official communications of postal officers and members of congress. Besides, the United States postal service is the most extensive of any country in the world, providing for each 1,056 persons an established post office. The volume of business transacted each year may be understood by the following items drawn from a report issued for the year 1900:

Articles of all kinds for foreign countries	45,650,000
Articles sent free of postage	392,500,000
Newspapers, periodicals, etc.	988,690,000
Letters, postal cards, etc.	2,950,785,000
Other articles	680,350,000

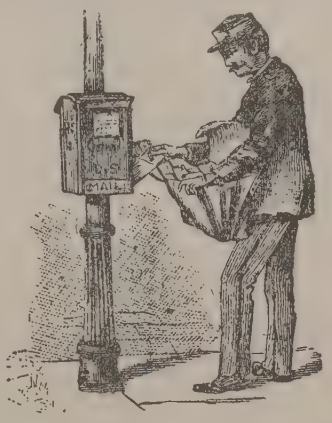
The rate of postage on letters depended upon distance in the early period of postal regulations, varying from eight to twenty-five cents per letter, but in 1816 the rates were graded at from six and one-quarter to twenty-five cents. In 1846 the rates were reduced to three cents for distances not exceeding 300 miles, and ten cents was charged when the distance was over 300 miles. The rate on prepaid mail was fixed at three cents for all distances under 3,000 miles in 1851, but if not prepaid five cents was collected on delivery. Congress passed a law in 1856 making the prepayment of postage compulsory, and a uniform rate of three cents for each half ounce or fraction thereof was established for all distances in 1863. The rate was reduced to two cents for each ounce or fraction thereof in 1885, and only one cent was established as the rate for drop letters, except in localities having free delivery, where the rate for drop letters remained at two cents. Domestic rates and conditions apply to all classes of mail matter sent from the United States to the Philippines, Porto Rico, the Hawaiian Islands, and Guam.

All mailable matter is divided into four classes. First-class mail includes all letters and parcels sealed against inspection. Periodicals issued at regular intervals not less than four times a year comprise second-class mail matter, and the rate of postage is one cent a pound, but publishers may send their publications free of postage to subscribers residing within the county of publication. In 1901 the postmaster-general promulgated a rule that excludes books published under the guise of serial publications from the mails as second-class matter. Circulars, proof sheets, books, transient newspapers, and all printed matter not issued periodically

are included with third-class mail matter, and the rate of postage is one cent for each two ounces, though each separate parcel is limited so as to not exceed four pounds in weight. Mail matter of the fourth class includes articles of merchandise and all matters not included in the other three classes. The rate of postage for fourth-class mail matter is one cent per ounce and the weight is limited to four pounds. All postage must be prepaid, except that only two cents need necessarily be prepaid on each article of the first class, and all matter coming under the first three classes may be registered by paying the postage in full and eight cents in addition. Any mail matter failing of delivery, except circulars, advertisements, and other printed articles of no apparent value, is returned to the sender. The return is made direct to the sender if the matter bears upon the outside the name and address, otherwise it is sent to the Dead-Letter Office, in Washington, where it is opened after thirty days and sent to the proper party. Many of the letters and parcels contain money or negotiable paper of value. However, they are all restored to the owner. This is true also of parcels containing merchandise. If the owner cannot be found, they are sold at auction. Auctions of parcels of merchandise unclaimed are held after the parcels remain unclaimed for two years.

There are five general methods of transporting the mails. They consist of transportation by railways, steamboats, ocean steamers, mail messengers, and the star service. Congress is authorized to make contracts for carrying mails, which is done through the postal officials. The star route service is utilized in sections of the country where the mails cannot be carried by railroads or water navigation, and are transported by carriage or stage, on horseback, or a-foot. In 1874 the International Postal Convention in session in Berne, Switzerland, concluded terms whereby the Universal Postal Union was organized, which went into operation on July 1, 1875. Practically all the nations have now joined the union, thus establishing uniform rates of international postage. The rates on letters are five cents a half ounce if prepaid, and double that rate if not prepaid. Postal cards are sent at two cents each, and one cent for each two ounces is the rate for printed matter and merchandise if prepaid, otherwise double that rate.

The special delivery authorized by congress in 1885 provides for messengers who deliver mail matter immediately after it is received at the post office. This system extends to all post offices, and in the larger cities permanent messengers are constantly on duty, but in other offices the postmaster effects delivery by any means available. The amount charged in addition to regular postage is ten cents, and the profit to the government accruing from this system aggregates about $32,000 annually. Free delivery was first authorized by an act of congress in 1863, and under this system carriers are employed by the government to deliver letters and other mail matter at the home or place of business indicated by the address. These carriers collect the mail matter to be sent from boxes, where it is deposited by the senders. Originally free delivery systems were established only in cities having a population of 10,000, or a gross annual revenue of $10,000, but now many rural districts have been included, and the mails are carried by special messengers to many of the farm homes. Free delivery in cities and rural districts has proven popular, and is being extended constantly in all sections not already supplied.



POSTMAN COLLECTING MAIL.

The post office system is under the direction of the postmaster-general, who is a member of the president's cabinet. There are four classes of post offices. The post offices having gross receipts of $1,000 or more are divided into the first, second, and third classes, and those having less than that amount constitute the fourth class. Four assistant postmasters-general are appointed by the president, but all other officers and employes of the department are named by the postmaster-general. The salaries paid to postmasters filling presidential post offices range from $1,000 to $6,000 annually, being graded according to the volume of business, while fourth-class postmasters are paid in proportion to the amount of stamps canceled. The post office system of the United States is a vast and efficient institution. Any attempt to interfere with the mails, or the commission of offenses relating to the post office business, such as embezzling, robbing, or destroying any mail matter, is punishable by the government with much severity.

POTASSIUM (pŏ-tăs'sĭ-ŭm), a metallic element of a bluish-white color, which was discovered by Sir Humphry Davy in 1807. It is brittle and crystalline at 32° Fahr. and

may be easily cut with a knife at 58°. At 145° it becomes a perfect liquid. Its specific gravity is .875; thus, it is one of the lightest of all the metals. When thrown upon water, the metal decomposes with much rapidity, forming hydrates of potassium, while the escaping hydrogen takes fire and burns with a rose-red color. Metallic potassium is prepared by decomposing potassium carbonate by carbon at a white heat. It is sold in the trade in round, brownish masses, and, since exposure causes a film of oxide to form at the surface, it must be preserved under a liquid free from oxygen; naphtha and rock-oil are generally used for that purpose. Potassium is a conductor of electricity. Chloride of potassium is a preparation sold in the market as muriate of potash, and resembles common salt, being obtained from the brine of mineral springs, sea water, and the ashes of marine plants. Other preparations of potassium salts include bromide, iodide, nitrate or saltpeter, sulphide, fluoride, phosphide, chlorate, sulphate, cyanide, phosphate, and ferrocyanide. Saltpeter, bromide, and iodide are used in the medical practice, while the other preparations are employed in mechanic arts and as artificial manures.

POTATO, one of the most valuable food-producing plants. It is cultivated extensively in all the sub-tropical and temperate countries. The potato is native to the Andean region of South America, where it was cultivated by the Incas long before the discovery of America, and was first brought to Europe from Peru by the Spaniards. Its culture spread rapidly in Italy, Spain, the Netherlands, and Germany before the middle of the 16th century, and was first introduced into England by Sir John Hawkins in 1563. By the close of the 18th century its culture and use had spread over most of Eurasia, and it has since continued a favorite food of all classes, but particularly of the poorer people of Europe.

COMMON POTATO.

The potato belongs to the same family as the nightshade, tobacco, and henbane. It is a perennial plant with large, herbaceous stems, growing from one to three feet in height. Its leaves are pinnate, and the flowers are of a whitish, bluish, violet, or variegated color. Some species bear a globular fruit somewhat larger than a gooseberry, which contains a number of small seeds. The tubers are the valuable part of the plant, and grow underground on slender leafless shoots or branches that differ in character from the true roots. They are different in form, size, color, quality, and time of ripening, and their size has been greatly increased by cultivation. The value of the tuber depends upon the starch and other matters stored in it. These are usually about twenty per cent. of starch, five per cent. of woody matter, four per cent. of sugar, gum, albumen, casein, gluten, and kindred substances, and about seventy-one per cent. of water. Each potato has a number of eyes or leaf buds, and propagation is effected usually by planting pieces of the tubers, each piece containing one or more eyes.

Early varieties of potatoes mature in about three months, but the tubers may be utilized for food under favorable conditions in about six weeks after planting. Some varieties require longer time, but this depends somewhat upon the soil and climate. The yield is from twenty-five to 300 bushels per acre. The potato crop of the United States averages annually about 230,500,000 bushels, valued at $91,500,000. The states producing the largest annual yield usually rank as follows: New York, Iowa, Wisconsin, Illinois, Pennsylvania, Nebraska, Ohio, Michigan, Missouri, Minnesota, Indiana, Kansas, and Maine. Besides supplying a large quantity of food for man and animals, potatoes enter into the manufacture of starch, spirits, and sugar products. More than 500 varieties have been described. Those cultivated most extensively in the United States include the Early Rose, Early Ohio, Peerless, Burbank, White Star, Beauty of Hebron, and Peach Blow.

POTATO FLY, an insect allied to the cabbage fly, beet fly, and turnip fly. Maggots of the potato fly are often found in rotten or damaged potatoes in autumn, and in a mature state the fly is very similar to the house fly. The male has a grayish-black color, and the female an ashy-slate color. They differ also in that the former has five broad stripes on the back and four spots on the second and third segments, while the latter has spots on the second abdominal segment. See **Colorado Beetle**.

POTATO, Sweet, a climbing perennial plant cultivated extensively for its tuberous root, which is a wholesome and favorite article of food. The leaves are either cor-

date or lobed, and are borne on slender, twining stems. The roots are large, with somewhat pointed ends, of a reddish or yellowish color, and grow in clusters at small depth below the surface. Sweet potatoes are propagated by setting them out in the spring, and the rows are ridged in midsummer to facilitate the development of the tuber-roots. It is not certain where the nativity of the sweet potato really is, but it is regarded of tropical origin. Its culture is comparatively modern, but it was cultivated earlier than the common potato as a food plant. The difficulty experienced in preserving tubers over winter in cold climates has largely limited its culture, but it is more and more entering the trade as a favorite article of food. It is grown largely in the United States as far north as Michigan. A large, lighter colored and sweet variety is called yam.

SWEET POTATO: Root and Flower.

POTOMAC (pō-to′mak), a river of the Middle Atlantic States, which rises by two branches in the Alleghany Mountains in West Virginia, and after a course of about 400 miles enters Chesapeake Bay by a considerable estuary. It forms the boundary line between West Virginia and Maryland, and between Virginia and Maryland. Its course to Cumberland, Maryland, is in a northeasterly direction; thence it flows in a tortuous direction toward the east and northeast, but soon makes a bold turn toward the southeast, passing Harper's Ferry, Washington, and Alexandria. The estuary is one hundred miles long, and about eight miles wide at its entrance into Chesapeake Bay. Tide water reaches Washington, a distance of 125 miles from its mouth, and it is navigable for a large part of its course. Above Washington are several falls and rapids, which obstruct navigation.

POTOSI (pō-tō′sĭ), a city of Bolivia, on the slope of Cerro de Potosi, about fifty miles southwest of Sucre. The mountain has an elevation of 15,200 feet, and the city is situated on a sloping plain fully 13,250 feet above sea-level. It was founded in 1545 in the midst of a productive gold and silver mining region, and in 1611 had a population of 165,000. Among its buildings are several churches and schools, a government mint, and a monument in honor of Bolivar. Within recent years the mines have failed rapidly, chiefly because of a marked decrease in the value of silver, and much of the former city is desolate and in ruins. The surrounding country is unproductive aside from its extensive mineral deposits and grazing lands. Trade is carried on exclusively by stage and highway transports. Mount Cerro de Potosi is covered with snow perpetually, thus greatly modifying the climate, but there is an abundance of water for mining purposes. The productive mines of Potosi yielded in their greatest prosperity silver products valued at $1,500,000 annually. The city has a population of 12,500.

POTPOURRI (pō-pōō-rē′), a term derived from the French, and variously applied to indicate a medley or hotch-potch. It is the name of a mixture of dried, sweet-smelling flower-petals used to perfume a room, which is placed in a vase covered with a perforated lid. The flowers used chiefly are violets, roses, and jasmines, but they are mixed with lavender, cloves, sandal-wood, and musk. The term is used also to signify a kind of incense made of mixed gums and seeds; to describe a medley of musical airs; and to signify a literary production of parts brought together without a bond of connection. A mixture of meats and vegetables, such as a stew or pot-pie, is sometimes called pot-pourri.

POTSDAM (pŏts′dăm), a city of Germany, capital of the province of Brandenburg, sixteen miles southwest of Berlin. It is the second royal residence of the kingdom of Prussia. It is finely situated on the Havel River and is connected with Berlin by electric car lines and railways. In its vicinity are a number of beautiful lakes and ranges of hills covered with forest trees. The surrounding country has a fertile soil, producing cereals, fruits, and tobacco. Among the noted buildings are the royal palace, a gymnasium, and numerous churches. The Church of Garnison has a tower 400 feet high, and under its pulpit are the remains of Frederick William I. and Frederick II. It has a number of beautiful public gardens and boulevards, a public library, and several excellent statues and monuments. Potsdam was the favorite residence of Frederick the Great and the birthplace of Alexander von Humboldt. It is supplied with modern municipal facilities, and has manufactures of cotton, silk, and woolen goods, machinery, tobacco products, wax cloth, chocolate, scientific instruments, and porcelain. Potsdam was a fishing vil-

lage until 1660, when Frederick William I. made it a royal residence and built its magnificent palace. Population, 54,625.

POTSTONE, an impure variety of soapstone, composed of a mixture of mica, talc, and chlorite. Though soft when quarried, it becomes hardened by exposure to air, and is used to some extent in making household utensils. In ancient times it was used chiefly for that purpose, and its utility appears to have been widely known, since it is mentioned by Pliny and other ancient writers. There are extensive deposits in Greenland, Austria, the Scandinavian peninsula, and in Upper Egypt.

POTT, August Friedrich, philologist, born in Nettelrede, in Hanover, Germany, Nov. 14, 1802; died in Halle, July 5, 1887. He graduated at Göttingen, and soon after became professor of languages in the University of Halle. Pott ranks next to Bopp, Humboldt, and Grimm as a writer on comparative philology. His works show remarkable knowledge of the Aryan languages, and those of races native to America, Africa, and Asia. His best known writings include "Gypsies in Europe and Asia;" "Researches in the Etymology of the Indo-Germanic Languages;" "Philological Differences of Races," and "Proper Names."

POTTAWATTAMIES (pŏt-ta-wŏt'a-mĭz), an Indian tribe of North America, belonging to the western branch of the Algonquin family. It early occupied the region now included in lower Michigan and upper Indiana and Illinois. The French established successful missions among these Indians at Green Bay, but they afterward joined Pontiac. They were hostile to the Americans during the Revolution, but concluded a peace treaty in 1795. In 1812 they again aided the English, but in 1815 ceded nearly all their territory, when many were assigned land in Missouri and Kansas. At present the tribe numbers about 1,750, of whom 575 are in Kansas, 100 in Michigan, 300 in Wisconsin, and 775 at the Sac and Fox agency in Oklahoma. Many members of this tribe are advanced in educational and industrial arts, and are successful in cultivating the soil.

POTTER, Alonzo, clergyman, born in La Grange, New York, July 6, 1800; died in San Francisco, July 4, 1865. After graduating from Union College in 1818, he began his theological studies, and in 1821 became professor of philosophy and mathematics in Union College. Soon after he was admitted to the ministry of the Protestant Episcopal Church, and in 1826 became rector of St. Paul's Church in Boston. He was recalled to a professorship in Union College in 1832, became its vice-president in 1838, and was practically the head of the college till 1845, when he was chosen bishop of the diocese of Pennsylvania. Potter was a man of rare executive ability and managed the affairs of the bishopric with marked efficiency. He opposed slavery by his pen and voice. His writings include "Religious Philosophy;" "Political Economy;" "Handbook for Readers and Students," and "Discourses."

POTTER, Henry Codman, clergyman, born in Schenectady, New York, May 25, 1835. He completed the course of study at Union College in his native town by graduation, and studied at the Theological Seminary of Alexandria, Virginia. He was first made rector of a church in Pennsylvania, but after efficient service was appointed to the rectory of St. John's Church, Troy, New York, and later to the Boston Trinity Church. From 1868 till 1883 he was rector of Grace Church, New York, but in the latter year was made assistant bishop of New York, and four years later became bishop. Among his writings are "Gates of the East;" "Sisterhoods and Deaconesses;" "Discourses;" "Waymarks," and "Sermons of the City."

POTTER, Paul, noted painter, born at Enkhuysen, Holland, in 1625; died in Amsterdam, Jan. 15, 1654. His father, Pieter Potter, was a landscape painter, and under his direction he received early training in Amsterdam. He executed a number of famous paintings before he attained the age of fifteen years, and in 1650 settled at The Hague. In 1652 he returned to Amsterdam under an engagement of the burgomaster, who retained him to execute many important paintings. Constant work at the easel injuriously affected him, and he died at the early age of twenty-nine years. The genre paintings of Potter are more highly valued than like pictures of any other of the great masters; his "Dairy Farm," a most excellent work, nineteen inches wide and forty-eight inches long, sold in 1890 at London for $30,450. Other excellent paintings are "Shepherd" and "Herdsman."

POTTERY (pŏt'tĕr-ў), the art of manufacturing earthenware or porcelain by modeling any kind of clay when in a plastic condition and then hardening by fire. This art was practiced from remote antiquity, the remains and monuments of various races giving it a standing among the industries pursued in prehistoric times. Both glazed brick and tiles have been found among the ruins of ancient Nineveh, and on the monuments of Thebes are views of potters at work, showing that earthenware entered prominently into household and public service many centuries before the Christian era. The Mosaic writings make mention of earthenware. In the Metropolitan Museum in New York are fine specimens of pottery, among them jars, vases, cups, lamps, and household utensils, brought by General di Cesnola from Cyprus, where they were made by the ancient Phœnicians. It is thought that the Greeks learned the art of making pottery from the Egyptians and the Phœnicians, and that the Romans learned it from the Greeks. There were extensive potteries at Athens, Samos, and Corinth, where most of the pot-

tery of Grecian manufacture was made. The product from these potteries was of splendid design and ornamentation, specimens extant possessing remarkable perfection. Many of the vases now made are patterned from the finest Grecian products.

The art was carried to Spain by the Arabs, who have credit for introducing the manufacture of glazed ware into western Europe. This art was long thought to be of relatively modern origin, but excavations made in the ruins of Babylon in the last century have disproved this view, since many glazed products were found there, among them glazed coffins, vases, and household utensils. The celebrated majolica wares were first made by the Arabs in the island of Majorca, and in the 15th century the art was introduced at Florence and other Italian cities. The French learned it of the Italians, though some essentials of the art were held as secrets until Bernard Palissy, a French potter, discovered the important features involved in making majolica, and subsequently added many valuable improvements by way of ornamenting with splendid pictures of sea animals, landscapes, and views from nature.

PORCELAIN VASE.

Artistic pottery was introduced into Germany, Gaul, and Britain by the Romans, who made products from native clays, but rude ware had been made in these regions for centuries before. The Dutch developed a peculiar kind of pottery, known as delft, from its extensive manufacture at Delft, Holland. Delft wares were more solid but less beautiful than those derived from Eastern methods, but they were used extensively for their remarkable strength. This art was introduced by the Dutch into England, where large quantities were made for several centuries. Josiah Wedgewood, an English potter, discovered methods for making more ornamental designs about the middle of the 18th century, and may be regarded among the most celebrated manufacturers of modern times. The extensive manufacture of pottery in the United States is of comparatively recent date, and at present not more than sixty per cent. of the wares sold in the American market are of American manufacture. However, there is a constant growth in the annual output, which represents a total value of about $30,500,000. The principal pottery factories in America are located at Trenton, New Jersey, and East Liverpool, Ohio, and there are large manufactories at Cincinnati, Baltimore, Boston, New York, and Wheeling, West Virginia.

MAJOLICA JAR.

The manufacture of porcelain has been an important industry among the Chinese and Japanese from a period ante-dating the Christian era. They were making the finest grade of porcelain while the Greeks were yet using terra-cotta vases, and their skill in the finer ceramic art dates fully 2,000 years earlier than that of the Europeans. King-te-chin in the province of Kiang-si was for centuries the center of vast potteries, and it is known that excellent grades of porcelain were made there in the 6th century A. D. There were many thousand porcelain furnaces in that city in the 18th century, but the Tai-ping insurrection destroyed practically all the works. The varieties of Chinese porcelain are endless in form and decoration, and contain some of the most delicate and beautiful qualities known. Many specimens of the blue ware made before the Middle Ages possessed much value, and it is from them that the Delft manufacturers first copied their blue-colored delft ware. The clay used in making porcelain is called kaolin, and was thought to be found only in China, but in 1711 Friedrich Böttger found large deposits of it near Dresden, Germany. He learned the secret of making porcelain while employed by the elector of Saxony, and a factory was established at Meissen, near Dresden, where the well known Dresden porcelain is still made. A workman carried the secret to Vienna in 1720, which became a noted center of porcelain manufacture, and these two cities are

still among the most extensive producers of these products in Europe. The principal porcelain manufactory in France is at Sèvres, and the most noted of England is in Staffordshire. Kaolin deposits are abundant in the United States, notably in Delaware, Pennsylvania, New Jersey, Missouri, the Carolinas, Ohio, Illinois, and Maine.

Many different kinds of pottery are made, but all varieties are produced by molding the clay while in a moist condition into the forms desired, after which they are baked in an open fire. The molded forms are ornamented with patterns stamped into the clay before firing, but some of the grades are plain. Manufacturers learned to mix various matters with the clays as the art developed, thus enabling them to make finer and more delicate pottery, and later beautiful decorations were added by painting. Pottery is said to be soft when its surface is unglazed and easily scratched by a piece of iron, and hard when the iron has no effect on it. A common flower-pot belongs to the soft earthenware, and a Sèvres plate to the hard variety. Between the two grades are many different kinds of wares. Pottery is generally divided into earthenware, stoneware, and china or porcelain. Earthenware is soft and includes many varieties. Among them are such unglazed ware, as bricks, terra-cotta, and flower-pots; lustrous ware, including products baked and coated with a slight vitreous glaze, as ancient Greek vases; glazed ware, embracing ordinary clay ware with a lead glaze, as common household ware; and enameled wares, including ordinary clay ware with an opaque glaze, as Italian majolica or Dutch delft. Stoneware is a kind of pottery characterized by hardness and infusibility, properties due to the silica in the clay forming the body. The two principal varieties are a kind generally colored or dark and usually coated with a salt glaze, as a stoneware crock; and a kind light in color and coated with a vitreous glaze containing lead, as granite-ware.

Porcelain is the finest and most valuable grade of pottery, and is characterized chiefly by hardness. It is almost infusible, somewhat translucent, and usually has an alkaline glaze. It is made of a body of clay containing silica, usually called kaolin. The principal classes include the hard porcelain, made of a body of kaolin and feldspar, as the porcelain known as Chinese, Berlin, and Sèvres; the soft porcelain, made of kaolin and calcium phosphate coated with a lead and boric acid glaze, as Worcester porcelain; and artificial porcelain, a kind resembling glass and made chiefly of alkaline salt and coated with a lead glaze, as the porcelain formerly made at Sèvres, France. Pottery is made by the workman molding and turning the plastic clay on his wheel, a kind of turning lathe, and it is then taken to a room and partially dried under a high temperature. After drying to what is called the green state, the product is again placed on the lathe for the purpose of giving it a truer shape and smoothness. However, this depends largely on the form of the articles, since the more complicated circular form must be pressed into molds of plaster of Paris, and the work is done almost exclusively by hand. Practically the only machinery used in making pottery are the machine for mixing clay and the turning wheel of the workman, and it is probable that machine labor can never be introduced to any considerable extent, since it is practically impossible to substitute any mechanical device for the molding hand of the potter. The articles are ready for the kiln as soon as they are properly shaped and dried, and they are exposed to a high temperature about forty hours. It is necessary for the kiln to cool very slowly, since rapid cooling causes the articles to warp or crack. They are glazed by immersing in a vitrified composition and subjecting to heat a second time. Decorations are put on in various ways, in some cases by press printing and in others by hand. Paintings are put on earthenware by a brush, usually over the glaze.

MAKING POTTERY.

POTTSTOWN, a town of Montgomery county, Pennsylvania, on Schuylkill River, thirty-eight miles northwest of Philadelphia. It is surrounded by an agricultural and mining district, has excellent railroad facilities, and is the center of large manufacturing enterprises. Among the manufactures are dairy products, brass fittings, ironware, steel bridges, nails, iron plate, and farming implements. Fully twenty creameries are in its vicinity. The town has good church and school buildings. It is improved by modern facilities. Population, 1900, 13,696.

POTTSVILLE, a city of Pennsylvania, in Schuylkill county, on the Schuylkill River, thirty-five miles northwest of Reading. It is at the junction of several railroads. The surrounding country is a mining region that yields annually about 6,000,000 tons of coal. Among the manufactories are rolling mills, machine shops, stove foundries, potteries, nail and spike mills, planing mills, cigar and shirt factories, and silk and woolen mills. It has excellent public schools, electric lights and street railways, waterworks, and a public library of 12,000 volumes. Pottsville is the county seat. It has a fine courthouse and other county buildings, and is the seat

of a children's home. Population, 1900, 15,710.

POUGHKEEPSIE (pō-kĭp'sĭ), a city of New York, county seat of Duchess county, on the Hudson River, seventy-two miles north of New York City. It is at the junction of several railway lines, and has a large commercial and manufacturing trade. The principal manufactures include silk and cotton goods, boots and shoes, carriages, dyestuffs, farming implements, ironware, clothing, and machinery. An excellent railroad bridge of masonry and steel crosses the Hudson, and the city is connected with adjacent towns by an extensive street railway system. The State Hospital for the Insane is situated two miles north of the city, and represents with its attached grounds a value of about $950,000. It is the seat of a large number of educational institutions, among them Vassar College. This institution was founded in 1865 by Matthew Vassar, a wealthy brewer, and is regarded the finest women's college in the world. Other educational institutions are the Riverview Military Academy, Poughkeepsie Military Academy, Lyndon Hall, Quincy School, and Eastman National Business College; the last named has about 975 students. Poughkeepsie is beautifully platted. It has all modern municipal facilities, contains many excellent business blocks and residences, and is beautified by avenues of trees, gardens, and parks. Population, 1900, 24,029.

POULTRY (pōl'trў), the term applied generally or collectively to domestic fowls. They are reared for their flesh, eggs, or feathers, as chickens, geese, turkeys, ducks, guineas, and pigeons. The common chickens are the most important of the domesticated birds, since both their flesh and eggs are wholesome and favorite food. Such naturalists as Darwin ascribed the origin of the domesticated breeds to the Bankiva fowl, but the varieties have been increased materially by propagation. We learn from history and ancient paintings that poultry culture is of great antiquity, both civilized and savage peoples engaging more or less successfully in rearing different classes of birds. By far the largest amount of poultry reared in the United States, and for that matter in all countries, is bred by farmers and others who make its culture a profitable adjunct to other enterprises, though in some localities special poultry farms are maintained. In many parts of France and Germany poultry keeping is the leading pursuit of the peasant, and in many places extensive yards may be seen for the confinement of chickens, while in others herders are employed to watch over vast flocks of geese and ducks. The total annual production of poultry in the United States has a value of $550,000,000, and the production of eggs, $250,000,000; about 50,000,000 eggs are consumed daily. The eggs of chickens comprise the most important poultry product sold in the market of the United States, and the eggs of geese, ducks, and guineas are marketed only to a limited extent. As a rule, chickens and turkeys are reared for their flesh and eggs; geese and ducks for their flesh and feathers; pigeons for their

PLYMOUTH ROCK CHICKENS.

flesh; and guineas for their flesh and eggs, and for ornament in the barnyard.

In propagating poultry it is necessary to take into account the objects desired, especially in chickens, since the varieties best adapted for flesh are as a rule inclined to lay only a limited number of eggs, while the prolific layers are rather of under size. For mixed farming it is usually desirable that the size be medium, thus combining both flesh and egg-producing qualities. The different kinds of poultry require different treatment, but all retain a higher state of health when allowed to run in spacious yards where they may feed on different forms of insects and vegetation. It is necessary to provide clean and well ventilated houses, sufficiently warm in the winter time, and provided with ample sunlight. Soft food is beneficial to laying hens, and it is quite necessary to supply a quantity of lime food and gravel, the former entering into the composition of the egg-shell, and the latter as a digestive agency. Among the most wholesome foods are corn, wheat, rye, and food prepared from these cereals by grinding and soaking. Chickens are very industrious in searching for food in the soil by scratching, while geese and ducks delight in bathing and searching for food at the bottom of shallow water. The eggs of chickens require three weeks for incubation, while those of turkeys, geese, and ducks require four weeks, and usually all eggs hatched are placed under sitting hens. Within recent years machines have been constructed for artificial incubation; the warmth necessary is provided by lamps or by an electric current. There are many advantages that result from the use of incubators, particularly the benefits derived from the ability to

secure broods at any season of the year, and to obtain any number of young at a brood.

POUND, a unit of weight, which is used as a standard in several countries for the measurement of any commodity bought and sold by weight. There are different kinds of pounds; those used in the United States are the Troy and avoirdupois pounds. The former is equal to twelve and the latter to sixteen ounces. The Troy pound has 5,760 grains, the standard being obtained by weighing a cubic inch of distilled water at 62° Fahr., the barometer being thirty inches, which then weighs 252.458 Troy grains. The avoirdupois pound is equal to 7,000 Troy grains; hence the Troy pound is to the avoirdupois as 144 to 175. The pound is of English origin, and was derived from the weight of 7,680 grains of wheat taken from the middle of the ears and well dried, hence grains form the lowest fractional part of a pound. This continued to be the standard pound from William the Conqueror to Henry VIII., but in the reign of the latter the avoirdupois pound of 7,000 grains came into use. Since the time of Elizabeth it has been the standard in England, whence it was brought to America and is now used in the United States. The principal English coin of account is called pound, and corresponds to the coin of circulation known as sovereign, which has a value of about $4.80. It is divided into twenty shillings or 240 pence, and weighs 123.27+ Troy grains. The name was derived from the fact that one pound of silver was formerly coined into 240 silver pence, but now forty pounds of gold are coined into 1,869 sovereigns. The sign of the pound is £.

POWDER. See **Gunpowder.**

POWDERLY (pŏw'dẹr-lĭ), **Terence Vincent**, labor organizer, born in Carbondale, Penn., Jan. 22, 1849. He became a switchman on the Delaware and Hudson River railroad at the age of twelve, and engaged as a laborer in the machine shops at Scranton when nineteen. He was elected as a labor candidate to the office of mayor of that city in 1877 and was reëlected in 1878. In 1879 he became general master workman of the Knights of Labor, a position he held till 1893, when he was succeeded by James R. Sovereign. President McKinley appointed him commissioner-general of immigration in 1897. Powderly is the author of several treatises on the labor question, and contributed extensively to the "Arena" and the "North American Review."

POWELL (pŏw'ĕl), **John Wesley**, geologist, born in Mount Morris, New York, March 24, 1834; died Sept. 23, 1902. He studied at Oberlin College, and entered the Federal service at the beginning of the Civil War. For valued service he was promoted to the rank of lieutenant-colonel, and at the battle of Shiloh lost his right arm. In 1865 he became professor of geology in the Iowa Wesleyan University, and later in the Illinois Normal University, at Bloomington. He was engaged by the Smithsonian Institution, in 1867, to conduct geographical and geological surveys in the Rocky Mountain region, and later explored the Grand Canon of the Colorado River. Soon after he became director of the Bureau of Ethnology, which was established by the government, and in 1881 succeeded Clarence King as director of the United States survey. He resigned the latter position in 1894 owing to delicate health, but retained the directorship of the Bureau of Ethnology. Degrees were granted him by the University of Heidelberg, Germany, and by Harvard. His writings include "Report on the Arid Region of the United States;" "Exploration of the Colorado River;" "Contributions to North American Ethnology," and "Introduction to the Study of Indian Languages."

POWERS, Hiram, sculptor, born in Woodstock, Vermont, July 29, 1805; died June 27, 1873. He was the son of a farmer, and after attending public school, he engaged with a clock-maker at Cincinnati, where he was instructed by a German sculptor named Eckstein. After acquiring considerable skill in modeling and pasteling, he went to Washington, in 1834, where he was engaged to execute busts of the president and a number of leading statesmen. His success enabled him to go to Florence, Italy, in 1837, where he devoted the remainder of his life to works of art. He is noted chiefly for his excellent busts of American statesmen. His statue of "Eve," completed in 1838, was admired by Thorwaldsen, and the following year he attained a world-wide reputation by his celebrated "Greek Slave." Other works of renown include "Fisher Boy;" "Last of His Tribe;" "Proserpine," and "America."

POWHATAN (pow-hạ-tăn'). See **Pocahontas.**

POYNTER (poin'tẹr), **Edward John**, British artist, born in Paris, France, March 20, 1836. He studied at Westminster School and Brighton College, and while in Madeira for his health, in the winter of 1852-53, developed a strong taste for artistic painting. The following year he studied at Rome, and in 1856 took training at Paris. His first exhibits at the British Institution were made in 1859, and in 1869 he became an associate of the Academy. During the interim he devoted much time to the study of Egyptian art, and prepared illustrations for "Once a Week" and for Dalziel's "Illustrated Bible." He became professor of art in the London University College in 1871, and was made a full academician in 1876. In 1896 he succeeded Frederick Leighton as president of the Royal Academy, and was knighted at Windsor. The paintings of Poynter are very numerous and of a high quality. They include "Israel in Egypt;" "Prodigal Son;" "Golden Age;" "Cecil Wedgwood;" "Ides of March;" "Meeting of Solomon and Queen of

Sheba;" "Earl of Harwood," and "Lord Ripon." He published "Ten Lectures on Art," and painted seventy cartoons for the mosaic of St. George, Winchester. The paintings of Poynter are quite true to nature, and are pleasing because of their excellent coloring and finish.

POZZUOLI (pŏt-sōō-ō′lē), a city of Italy, anciently called Puteoli, situated on the Bay of Naples, about seven miles west of Naples. It is of interest because of its ancient importance, when it contained the Temple of Augustus and an amphitheater with a seating capacity of 30,000 persons. The temple has been converted into a cathedral, and the amphitheater, famous because of its gladiatorial fights under Nero, is in ruins and partly submerged in the sea. Among the other buildings of historic interest is the Temple of Serapis, an Egyptian god. This structure had a portico of twenty-four pillars, thirteen of which still remain. It had several other temples of interest, the harbor of Puteoli, and numerous baths and tombs. Hannibal made an unsuccessful assault upon the city in 214 B. C., and toward the latter part of the republic it was the principal port of Rome. A railway connects Pozzuoli with Naples. Population, 12,130.

PRÆTOR (prē′tẽr), the official title of the consuls at Rome. In 367 B. C. the consulship was thrown open to the plebeians, and the patricians stipulated that a patrician magistrate should be appointed to act as supreme judge in the civil courts. His official title was prætor. The prætorship was opened to the plebeians in 336 B. C. Owing to the large number of foreigners residing in Rome, it was found advisable to appoint a second prætor about 245 B. C., whose duty was to decide suits between aliens or between aliens and citizens. In 227 B. C. the number was increased to four, the two additional prætors being elected to act as governors of provinces in Sicily and Sardinia. The number was increased to eight by Sulla and to ten by Julius Cæsar, and later to sixteen. These officers were elected by the people, and after holding their offices for one year, they were sent out by lot as governors of provinces.

PRÆTORIAN GUARD (prē-tō′rĭ-*an*), the body guard of the Roman emperors, which was organized by Augustus to take the place of the old body guard attached to the person of the commander-in-chief of the Roman army, such as attended Scipio Africanus. Emperor Augustus formed nine or ten cohorts, which consisted of 1,000 men each and included both infantry and cavalry. Only three of these were kept at Rome, while the others were stationed in different cities of the empire. The nine cohorts were centered at Rome by Tiberius, and Vitellius successively increased their number until sixteen cohorts were organized. The prætorians held office for from ten to sixteen years, and their power became so great that they were able to raise and depose emperors at their will. Their high-handed sale of the throne to Didius Julianus, in 193 A. D., caused Septimus Severus to reorganize them by replacing their number with the most trustworthy veterans serving on the frontier. Constantine the Great finally dispersed them in 312.

PRAGMATIC SANCTION (prăg-măt′ĭk săn̲k′shŭn), a term applied to a rescript issued by the head of a monarchy under the advice of his council to some order or body of people in relation to affairs of the state or the church. It was the custom of the princes of the Byzantine Empire to issue rescripts as declarations of law to individuals, but the solemn decrees issued by the sovereign became known as the pragmatic sanction. Since then it has been applied to solemn decrees issued in various countries. The most noteworthy include that of St. Louis in 1269, which contains articles against the assumptions of the papacy; that of Charles VII. of France in 1438, embodying the most important decisions of the council of Basel; that of 1439, giving the house of Austria control of the empire of Germany; that of Emperor Charles VI. in 1713, which finally passed the sovereign authority to his daughter, Maria Theresa; and that of Charles III. of Spain in 1759, granting the throne of the two Sicilies to his third son and his descendants.

PRAGUE (prāg), the capital of Bohemia, and the third largest city of Austria-Hungary. It is situated on the Moldau, which is there crossed by seven bridges, and is 152 miles northwest of Vienna. The city is beautifully situated, has wide and well improved streets, and contains a large number of excellent public and private buildings. The most noted structures are the St. Veits Church, a Gothic structure of the 14th century containing the remains of seven kings or emperors of Germany; the Hussite Church, with the grave of Tycho Brahe; the Roman Catholic cathedral; the Byzantine Church of St. George; the Theresa Institution for Ladies; the vast Czerni Palace, and a number of modern governmental buildings. It has a large number of excellent public schools and hospitals, several charitable institutions, a royal library, and numerous public parks and gardens. The University of Prague is one of the most noted of Europe, and is organized into two sections, one German and one Czech. This institution has a library of 150,000 volumes, about 3,000 students, and with it are connected a botanical garden, an observatory, and zoölogical and anatomical museums. The city is a noted railroad center, has electric lights and street railways, and a wide commercial and manufacturing trade. Among the manufactures are cotton textiles, silk and woolen goods, boots and shoes, beet-root sugar, spirituous liquors, clothing,

leather, scientific instruments, machinery, engines, hardware, and pottery. Prague was founded by Princess Libussa in 722, and its great university attracted students from every part of Eurasia in the 14th century. The Hussites conquered it in 1424, and it suffered greatly in the Reformation. Frederick the Great of Prussia captured it in 1744, and in the Seven Years' War it suffered or prospered according to the fortunes of battle, but since then it has gained constantly in population and commercial importance. The Prussians occupied it in 1866, as the result of the Austro-Prussian War, which was terminated with the treaty signed there on August 23, 1866. Population, 266,715.

PRAIRIE (prā'rĭ), meaning meadow-land, the name given by the early French settlers in America to extensive tracts of land destitute of trees. Subsequently the term was applied quite generally to the vast region lying between Ohio and Michigan on the east and the Rocky Mountains on the west, extending northward into Canada. The name applies locally only to fertile tracts entirely treeless, but, when speaking of prairie in the aggregate, considerable tracts of timber are necessarily included. The altitude of the great prairie region ranges from one hundred to 2,000 feet above sea-level. At Cairo, Illinois, and Keokuk, Iowa, the altitude is about 400 feet, and there is a gradual rise toward the north and northwest, thus giving the rivers a steady flow in all sections tributary to the Mississippi. The streams are bordered by belts of hardy and valuable timber, though there is a perceptible decrease in forest growth along the streams in some sections of Kansas, Nebraska, and the Dakotas, where portions of the surface are sandy and less productive than in other parts of these states.

This great prairie region includes fully 400,000 square miles. It has a generally undulating surface, and comprises one of the most valuable and productive regions of the world. In northern Iowa, western Minnesota, and the eastern part of the Dakotas beautiful clear-water lakes are abundant. Prairie soil is mostly composed of a black vegetable mold, and formerly many varieties of nutritious grasses were abundant, but now the region is covered by fields of cereals, meadows, orchards, and gardens. Though stones for building purposes are abundant in some sections, the soil is remarkably clear and unobstructed for cultivation and forms the most desirable extensive farming region of America. Formerly vast herds of deer, elks, buffaloes, and other animals were abundant, and thus provided a prolific hunting ground for Indians, but all these primitive conditions have given way to railroads, cities, and cultivated fields. Portions of the prairie region lying west of the one hundredth meridian are subject to an arid climate, and irrigation is resorted to for the purpose of supplying the necessary moisture, though all parts are capable of supporting vast herds of cattle, horses, and sheep without cultivation or irrigation.

PRAIRIE DOG, an animal native to the regions both east and west of the Rocky Mountains, and most abundant on the ele-

PRAIRIE DOG.

vated prairies. Prairie dogs are rodent mammals. They are allied to the marmot and prairie squirrel, but differ from the latter in having a more bulky body, shorter tail, and a voice resembling the bark of a dog. They live in groups known as towns or colonies. Their burrows are peculiar for having many compartments and an elevated mound at the exit, the opening for passage being at the middle of the mound. Several sentinels are stationed at convenient places, and at the approach of danger give warning to those who happen to be some distance from the colony. They are in no wise dangerous, though in some localities they devour much vegetable growth, and the quickness with which they enter their burrows on the approach of danger makes it exceedingly difficult to kill them. It is a remarkable fact that rattlesnakes and burrowing-owls live in the same burrows with prairie dogs.

PRATT, Charles, merchant and philanthropist, born in Watertown, Mass., Oct. 2, 1830; died in New York City, May 4, 1891. He commenced business at an early age in New York City, where he made a vast fortune in the oil and paint trade, and was a principal stockholder of the Standard Oil Company. Among his notable gifts to education are endowments to the Brooklyn Adelphi Academy and an endowment to the Pratt Industrial Institution of the same city. The latter is an industrial training institution, with an attendance of about 3,150 students and a library of 70,000 volumes. The endowment by Pratt amounted to $2,500,000.

PRATT, Enoch, philanthropist, born in North Middleboro, Mass., Sept. 10, 1808;

died in Tivoli, Maryland, Sept. 17, 1896. He was educated at the Bridgewater Academy, and in 1825 began business in Boston, but removed to Baltimore in 1831. He founded an institution for colored children at Cheltenham by donating 750 acres of land. Subsequently he founded the Maryland School for the Deaf and Dumb at Frederick, and in 1867 gave $30,000 to an academy in the town of his birth. In 1882 he founded the Pratt Library in Baltimore by donating $1,085,000. This library now has six branches, including about 175,000 volumes. He made a bequest of $2,000,000 to the Shepherd Asylum, with the proviso that the name be changed to the Shepherd and Enoch Pratt Hospital.

PRAXITELES (praks-ĭt'e-leez), an eminent sculptor of ancient Greece, who flourished at Athens about 364 B. C. Little was known of him personally even in the time of Pliny, but it is certain that he was one of the most eminent of Greek sculptors, and that he and Scopas were leading representatives of the later Attic school. His works were largely designed to display the beauty of Bacchic pleasures and the perfection of human form, especially female figures. Among his most noted works were the statues of Aphrodite at Alexandria, Cnidus, and Rome, of which the one at Cnidus is the most celebrated. Other productions include the statues of Apollo, Eros, and Dionysius. He also produced several groups of statues in marble and bronze, among them the group of Niobe and her children, now at Florence, though some attribute this group to Scopas. Most writers think that Praxiteles marks an epoch in the history of Greece, since his sculptures show a transition from the heroic and reverential age preceding the Peloponnesian War to the more pleasurable forms of later times.

PRECESSION (prē-sĕsh'ŭn), a term applied in astronomy to a slow motion of the equinoctial points on the ecliptic from east to west, causing the time between successive equinoxes to be perceptibly shorter than it would otherwise be. In 150 B. C. Hipparchus discovered that the equinoxes were falling back along the ecliptic, but, since the phenomenon depends for its explanation on the law of gravity, it was first explained by Sir Isaac Newton. This he did by showing that by the law of gravitation one body does not attract another in mass, but by acting on its separate particles, hence the sun does not attract the earth as a whole, but tends to pull the parts nearer to it away from those in proximity to the center, and those in the center away from the particles on the other side. The earth being flattened at the poles, there is a special tendency for the enlarged equatorial zone to be thus acted upon, and, if it were not for the rotation of the earth, it would be drawn down toward the ecliptic until it and the equator would ultimately be in one plane. The rotation of the earth modifies this action, and causes the points at which the earth's equator intersects the plane of the ecliptic to move slowly in a direction opposite to that in which the earth rotates. The precession of the equinoxes is to be attributed to the sun and moon, though the latter is twice as potent in producing it, owing to its nearness to the earth. It has been observed that the rate of precession is 50.24″ per year; that is, if we mark either point in the ecliptic in which the days and nights are equal over the earth, which is when the plane of the earth's equator passes exactly through the center of the sun, we find that the earth the next year comes back to that position 12 min. 34 sec. of time earlier. Since the circle of the ecliptic is divided into 360°, it follows that the time occupied by the equinoctial points in making a complete revolution at the rate of 50.24″ per year is about 25,800 years.

PRECIOUS STONES (prĕsh'ŭs). See **Stones, Precious.**

PRE-EMPTION (prē-ĕmp'shŭn), the right of purchasing land before others, a privilege accorded by law to an actual settler upon public lands under certain conditions. The first preëmption law was passed in the United States on March 3, 1801, and was designed to encourage colonization on the Miami River. A large number of special preëmption acts were passed prior to 1830, but in that year the first law of a general character took effect. The general law of 1841, which was repealed in 1891, gave actual settlers a prior right of purchase to 160 acres of public land. It was necessary to file a declaratory statement within thirty days after making settlement, and a final receipt was issued on proof of settlement and cultivation within a year after the declaratory statement was made. The price was $1.25 per acre for lands outside the limits of railroad grants, and within such limits $2.50 per acre. The right of preëmption extended to all persons over twenty-one years of age, who were unmarried or the heads of families, and those desiring to do so could convert a preëmption claim into a homestead. Under the preëmption law title could be secured to public land within a shorter time than under the homestead act, but those taking advantage of the latter receive title without making any payment for the land.

PRENTICE (prĕn'tĭss), **George Denison**, journalist, born in Preston, Conn., Dec. 18, 1802; died in Louisville, Kentucky, Jan. 22, 1870. He graduated at Brown University in 1823, studied law, and in 1829 was admitted to the bar. However, he engaged as editor of the "New England Review," and in 1831 became editor of the "Louisville Journal," a position he held until his death. His newspaper was an able champion of the whig party, and gave support to the Union cause throughout the Civil War. Prentice made his paper popular and influential by witty criticisms and able editorials. Among his

published works are "Life of Henry Clay" and "Prenticeana, or Wit and Humor." The "Louisville Journal" became consolidated with the "Courier" after his death, and is now known as the "Courier-Journal."

G. D. PRENTICE.

PRENTISS, Sergeant Smith, orator, born in Portland, Maine, Sept. 30, 1808; died in Longwood, Mississippi, July 1, 1850. He graduated from Bowdoin College in 1826, and the following year settled in the state of Mississippi. His remarkable oratorical power attracted the attention of the people, and his law practice became unusually successful. He served in the state legislature a term of years. He was elected to congress in 1837, but a contest of the election by Colonel Claiborne prevented him from taking his seat. In the following election he was given an overwhelming majority as a candidate for congress, and at once became remarkably popular on account of his eminent wit, argumentative power, and natural oratory. The two speeches giving him the greatest eminence are one delivered in Faneuil Hall, Boston, at a dinner in honor of Daniel Webster, and one defending a friend on a charge of murder before a Kentucky court, over which Judge Wilkinson presided. He removed to Louisiana in 1845, because he regarded the repudiation of the bonded indebtedness of Mississippi a disgrace.

PRE-RAPHAELITISM (prē-răf'ā-ĕl-i-tĭz'm), the designation applied to an organization of painters, whose members avowed preference for the great masters who lived before the time of Raphael, and drew inspiration for their work from nature rather than by following technical rules. This organization originated in the spring of 1848, and it was designed to found a new school of artists who would make the study of nature their direct object. Rossetti, Hunt, and Millais were the three leading representatives, and each made an exhibit at the Free Exhibition held in London in 1849. Rossetti exhibited the "Girlhood of the Virgin;" Hunt presented "Rienzi," and Millais brought forward his "Lorenzo and Isabella." These works were very highly complimented. However, adverse criticism arose to the newly formed brotherhood, partly from the jealousy of contemporary painters. The discussion continued for some years somewhat to the disadvantage of the Pre-Raphaelites, but Ruskin published several extended letters in the "London Times" in denunciation of those who assailed the new school and its promoters, and pointed out that good would likely result from the merit of their work and efforts. Since then many painters of this school have become eminent, particularly those named above.

PRESBYTERIAN (prĕz-bĭ-tē'rĭ-*an*), a Protestant denomination dating from a period shortly following the Reformation, and now largely represented in many of the countries of the world, particularly those of America and Europe. The denomination is thought to have originated at Halle, Germany, where John Brenz drew up a plan of organization in 1526. Branch organizations were formed at Strasburg, Frankfort, Geneva, and other cities under the leadership and direction of John Calvin. The first Presbyterian church in London was founded in 1549, while soon after John Knox became the spiritual leader of the denomination in Scotland. He established a powerful organization at Perth in 1557. Presbyterianism is now the most potent Christian organization in Scotland, and has a large membership in England. Westminster College, Cambridge, is its theological school in the latter country. In the United States several closely allied branches are recognized, the two larger being known as the Presbyterian Church North and the Presbyterian Church South. The former branch has 975,000 communicants and the latter 235,000. At present the Presbyterian churches of the world have 28,500 ministers, 4,225,000 communicants, and 3,875,000 Sabbath-school scholars.

All the Presbyterian churches have, as a primary element, a judicatory presbytery constituted of their delegated elders, of whom the minister is always one. Among the functions of the presbytery are to examine applicants for entrance into the ministry and grant them license to preach the gospel; to fill vacant charges by ordaining ministers; to adjust cases appealed from the church sessions held within the presbytery; and to superintend all matters relating to doctrine and discipline affecting the several congregations within its territory. The provincial synod may modify cases taken up on appeal from the presbytery, and appeal may be taken thence to the general assembly. This system of organization is maintained partly because of the unity of the church and partly on the ground that it is held to be in direct accord with the example set by the church in the apostolic age, and thus it is the most agreeable to the principles that may be deduced from Scriptures. The Reformed Lutheran Church may be said to be the forerunner of Presbyterianism. It is now the recognized state church of Holland. It is represented in the United States under the name of Reformed Church in America and by several allied organizations.

PRESCOTT (prĕs'kŏt), a city in Arizona, county seat of Yavapai county, seventy-five miles north of Phœnix. It is situated on an elevated site among mountains, and has railroad connections with the important trade

centers of the west. The surrounding country produces wool, lumber, minerals, and cereals. It has a growing trade, and is the seat of several fine public buildings. Population, 1900, 3,559.

PRESCOTT, William Hickling, noted historian, born in Salem, Mass., May 4, 1796; died in Boston, Mass., Jan. 28, 1859. He was a son of William Prescott(1762-1844), an American Revolutionary officer, and in 1814 graduated from Harvard University. An accident while playing at college resulted in the loss of his left eye. His other eye, being sympathetically affected, caused him considerable inconvenience for many years, until in the later part of his life he was almost totally deprived of sight. He entered his father's office as a law student shortly after graduating, but soon decided to engage in literary work and made an extended tour in Europe, visiting France, England, Germany, and Italy. In 1820 he married Susan Amory, and henceforth devoted his entire attention to profound study of history, which he conducted by the aid of secretaries.

WILLIAM H. PRESCOTT.

The first writings of Prescott were published in the "North American Review," and consisted of essays and criticisms, though his study was largely that of Italian literature. In 1826 he began the study of Spanish history, and, after laboring ten years, completed the "History of Ferdinand and Isabella," a work translated immediately into German, Spanish, and Italian. His next great work was the "History of the Conquest of Mexico," which he commenced in 1838 and completed in five years. In 1847 he published his "Conquest of Peru," and in 1855 issued two volumes of the "History of the Reign of Philip II., King of Spain." All the writings of Prescott sustained the interest aroused by his first attempts. He was a thorough scholar, an elegant writer, and was both methodical and persevering in his pursuits. His style is vigorous and interesting, and his life stands as a splendid example of industry and perseverance in the endeavor to accomplish a laudable enterprise. Among his writings not mentioned above are "Poetry and Romance of the Italians;" "English Literature of the Nineteenth Century;" "Critical and Historical Essays;" "View of the Ancient Mexican Civilization;" "Life of Hernando Cortez;" "View of the Civilization of the Incas," and "Essay on Cervantes."

PRESIDENT, the chief magistrate of a republic. This is the official title of the supreme executive officer of the United States. Presidents are elective, either by direct vote or through an electoral college, and serve for a definite term of years. The term of office of the president of Mexico and that of most of the South American republics is four years; of the French republic, seven years; and of the Swiss Confederation, one year. The term president was first used in America by William Penn, who proposed a scheme for the general government of the colonies in 1696, and gave its chief executive that title. The Albany convention proposed that of president-general, and the continental congress chose a presiding officer termed president. No such officer as a president of the United States was provided for under the articles of confederation, but there was an executive committee of thirteen, one from each state. They had no power except during the recess of congress, since that body possessed the executive power while in session. The constitutional convention of 1787 decided that there should be a single executive, to whom the title of president was given. The duty of the executive department is to see that the laws are faithfully and promptly executed, hence the efficiency of the president is one indispensable characteristic in the attainment of good government.

The term of office of the president is four years, and he may be reëlected, though public sentiment has constantly operated against more than one reëlection. The nine presidents chosen for two terms include Washington, Jefferson, Madison, Monroe, Jackson, Lincoln, Grant, Cleveland, and McKinley, though Cleveland did not succeed himself in the presidential office. Five vice-presidents succeeded to the presidency on account of the death of the presidents. The chief executives who died in office are William H. Harrison, who was succeeded by John Tyler in 1841; Zachary Taylor, by Millard Fillmore in 1850; Abraham Lincoln, by Andrew Johnson in 1865; James A. Garfield, by Chester A. Arthur in 1881; and William McKinley, by Theodore Roosevelt in 1901. The constitution provides that the president shall be a native born citizen of the United States, and have resided at least fourteen years within the United States immediately previous to his election. The age of eligibility is thirty-five years; the salary $50,000 per year, and it is provided that the president shall not receive any other emolument during his incumbency from any state or from the United States. Among the duties of the president are the conclusion of treaties with the advice and consent of the senate, and, under the approval of that body, to appoint cabinet officers, ambassadors, ministers, consuls, and first, second, and third-class postmasters; and to grant reprieves and pardons, except in cases of impeachment. He may require the opinion in writing of any cabinet officer

in relation to the duties of his respective office, and has veto power of any bill passed by congress, though a measure may become a law without his signature if two-thirds of the members of each house vote to pass the bill over his veto. The president has appointive power with the consent of the senate of judges of the supreme court, and all other officers of the United States whose appointments are not otherwise provided for.

Seven presidential cabinet officers may succeed to the presidency in case of the death or removal by impeachment of both the president and vice-president. The order of succession is as follows: secretary of state, secretary of the treasury, secretary of war, attorney-general, postmaster-general, secretary of the navy, and secretary of the interior. The secretary of agriculture and the secretary of commerce and labor can not succeed to the presidency for the reason that their positions were made cabinet offices after the passage of the succession law. Up to the ratification of the twelfth amendment, in 1804, the president and vice-president were not separately voted for in the electoral college, but the one obtaining the highest number of votes became president, and the second highest vice-president. Thomas Jefferson and J. Q. Adams were elected president by the house of representatives, and Richard M. Johnson was chosen vice-president by the senate in 1837. The election of presidential electors occurs every fourth year, the first election occurring in 1788, and is held on the Tuesday after the first Monday in November in all the states. The electors chosen meet in the capitals of their respective states on the second Monday in January following their elections to cast their votes for president and vice-president. From each state the votes are certified to the president of the senate, who counts them on the second Wednesday in February in the presence of both houses of congress, and the newly chosen president and vice-president are inaugurated on the 4th of March thereafter. See **Electors** and **United States.**

PRESS, the newspapers or periodical literature of the country taken collectively. The liberty of the press has been regarded a matter of supreme importance by modern writers. Contentions regarding the freedom to utter and argue according to conscience prevailed for many centuries, and the freedom of speech was long restricted to narrow limits in many European countries, where it is still abridged more or less for political or other reasons. Originally the constitution of the United States made no provision regarding liberty of the press, it being regulated by the states according to the established opinion of the people. In 1776 the states of Pennsylvania, Maryland, Delaware, and North Carolina adopted constitutions containing the earliest declarations in favor of the liberty of the press, and the first congress passed an amendment to the constitution providing that congress shall make no law abridging the freedom of speech and of the press. Citizens are held responsible for abuses in the United States, and are liable for damages or to a fine in case they willfully and unjustly assail the character or motives of any citizen or alien. The British established a strict press-censorship over the colonies in 1637, and it is now the rule of all nations to supervise more or less the publication of matters during the time of war. It may be said as a rule that the press is comparatively free in all the republics and in the smaller nations, but restricted more or less in the powerful monarchies, such as Russia, Austria, Germany, and Britain, though in the latter there is a comparative freedom except in Ireland. See **Printing.**

PRESS ASSOCIATION. See **Journalism.**

PRESSBURG (prĕs'bo͝org), or **Presburg,** a city of Hungary, on the Danube River, thirty-six miles east of Vienna. It has a beautiful location on a range of hills belonging to the Little Carpathians, is well provided with railroad and steamboat facilities, and is the seat of an important commercial trade. Formerly the kings of Hungary were crowned in Pressburg, and the city still contains the remains of a once beautiful royal palace. It has a cathedral of Gothic structure, an excellent Franciscan church, numerous educational institutions, and several hospitals, parks, libraries, and monuments. Among the manufactures are woolen and silk goods, tobacco products, paper, leather, chemicals, starch, confectionery, machinery, and ironware. It has electric lights, street pavements, and other municipal facilities. It was the capital of Hungary from 1541 to 1784, but in the latter year Buda was again made the capital by Emperor Joseph. German is the prevalent language, and the inhabitants include about 7,000 Jews. Population, 52,500.

PRESTON (prĕs'tŏn), a city of England, in Lancashire, near the estuary of the Ribble River, about twenty-six miles north of Liverpool. It is a convenient railroad center. Preston has an important navigation trade and modern municipal improvements. Among its most noteworthy buildings are a Gothic town hall, an exchange, several county buildings, and numerous churches, schools, and charitable institutions. It has a free public library, several parks, and is surrounded by a fertile region. Among the manufactures are spirituous liquors, cordage, brass fixtures, ironware, leather, clothing, and machinery. It is noted as one of the centers of linen and cotton manufacture of England. Its harbor has been improved materially. Preston has a large export trade in coal, and imports of iron, corn, and timber. Population, 114,618.

PRESTWICH (prĕst'wich), **Sir Joseph**, geologist, born near London, England, March 12, 1812; died June 23, 1896. He studied at Reading and the London University College, and after engaging for some time in commercial enterprises, he became devoted to a scientific career. His researches were made largely while connected with trade expeditions, and by means of them much knowledge was added to the fund of information in regard to the island possessions of Great Britain. He published, in 1851, his "Geological Inquiry Respecting the Water-Bearing Strata Around London," a work that remains a standard authority on the subject. In 1853 he became a member of the Royal Society. He was made president of the Geological Society in 1870, and while holding that position made several addresses on "Deep Sea Researches." He became professor of geology at Oxford in 1874, but retired in 1888 to devote his time exclusively to geological research. His writings include "Physical and Chemical Geology" and "Evidences of a Submergence of Western Europe at the Close of the Glacial Period." Queen Victoria knighted him in 1896.

PRETORIA (prē-tôr'ē-a), a city of South Africa, capital of the Transvaal, and so named from Pretorius, an influential Boer leader. It is conveniently connected by railway with Delagoa Bay, and with Johannesburg, Bloemfontein, Kroonstadt, and other cities. The country surrounding it is fertile, producing tobacco, wheat, sugar-cane, cotton, coffee, indigo, fruits, and vegetables. Among its noteworthy buildings are those erected by the government, numerous churches, several gymnasia and high schools, and many fine residences. It is well platted, has regular streets, and is supplied with pavements, telephones, waterworks, and other facilities. The president of the Transvaal republic had his official residence at Pretoria. Population, 13,500.

PREYER, Thierry William, German physiologist, born in Manchester, England, July 4, 1841. He was liberally educated at Bonn, Berlin, and Heidelberg, and also studied at Vienna and Paris. In 1867 he became professor of physiology at Jena, where he labored successfully for many years, and attained a reputation as one of the most eminent scholars of modern times. Among his writings are "Struggle for Life;" "Blood Crystals;" "Physiology of the Embryo," and "Hypnotism."

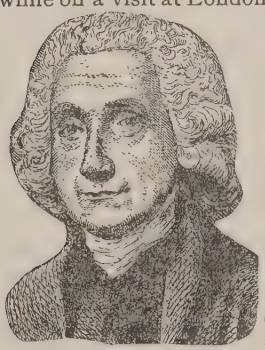
PRIAM, in Greek legends, the king of Troy in the period of the Trojan war. He was the son of Laomedon, and originally was named Podarces, but this was changed to Priam, which signifies the ransomed one, because he was saved from imprisonment and death by his sister Hesione, after having fallen into the hands of Hercules. He married Hecuba, daughter of Dymas, king of Thrace, and among his renowned children were the prophetess Cassandra, the valiant Hector, and Paris, the cause of the Trojan War. The city of Troy was under his government at the time of the famous Trojan War, which was caused by Paris carrying away Helen, but could have been prevented if he had restored her to the Grecians. His capital was destroyed after a siege of ten years, and he was killed by the hand of Neoptolemus while lying prostrate before the altar of Zeus, praying for divine assistance in the awful hour of peril. Homer does not mention his death, but it is recounted in the writings of Virgil and Euripides.

PRICHARD (prich'ard), **James Cowles**, physician and ethnologist, born in Ross, England, Feb. 11, 1786; died in London, England, Dec. 22, 1848. He was educated with much care in medicine and a number of modern languages, and secured an extensive training in history. His study was partly at the London St. Thomas Hospital, and at Edinburgh, Cambridge, and Oxford. In 1810 he located as a physician in Bristol, but was soon after appointed physician to the Bristol Infirmary. His first noted publication, "Researches into the Physical History of Mankind," appeared in 1813, and went through a number of revisions and translations. He published "Eastern Origin of the Celtic Nations" in 1831, in which he compared the different dialects of the Celtic with the Teutonic, Sanskrit, and other languages. Other writings include "Analysis of Egyptian Mythology;" "Diseases of the Nervous System;" "Treatise on Insanity," and "Insanity in Relation to Jurisprudence."

PRICKLY PEAR, a plant native to America. It is found along the Atlantic coast of the United States and in the Mississippi valley from Michigan to Arkansas. The varieties common to the region between Connecticut and Georgia are sometimes called Indian fig. They have a leafless, light-green stem, pale-yellow flowers, and bear an edible fruit an inch or more in length. The pulp of the fruit is juicy and has a sweetish but acid taste. The kindred species of the central Mississippi valley has larger flowers and fruit and a deep-green stem. Several varieties of prickly pear have been introduced and are now propagated in European countries bordering on the Mediterranean, and in China, Arabia, Persia, and Syria. The fruit is used extensively as food, but in some countries the plants attain a height of from five to eight feet, and are useful as hedge plants. A species of cactus is also known as prickly pear.

PRIESTLEY (preest'lĭ), **Joseph**, philosopher and divine, born near Leeds, England, March 13, 1733; died Feb. 6, 1804. He studied Latin and Greek in a public school, and later spent three years at a Dissenter academy at Daventry, London. In 1755 he became minister of a small congregation in Suffolk, and in 1761 was appointed teacher of languages at the Dissenter academy of Warrington. While there he married and

commenced his literary career. He formed the acquaintance of Benjamin Franklin, while on a visit at London, who supplied him with a number of books of service in his study and research. His first published work, "History and Present State of Electricity," appeared in 1767. About the same time he published "Theory of Language and Universal Grammar" and a work entitled "Vision, Light and Colors." The University of Edinburgh granted him a degree in 1766, and shortly after he became minister of the Mill Hill Chapel at Leeds.



JOSEPH PRIESTLEY.

Priestley was the first to discover oxygen, which he called dephlogisticated air, and announced his discovery in his work entitled "Experiments and Observations on Different Branches of Air," which appeared in 1774. Lord Shelburne appointed him librarian and literary companion about that time with a salary of $750 a year, and he accompanied the earl on a tour of Europe in the latter part of 1774. Later he was chosen minister of a Dissenter congregation at Birmingham, and became noted as a writer and speaker in favor of the French Revolution, which so excited public opinion that a mob set his house on fire and caused his library and manuscripts to be destroyed. He was compensated for this outrage, but the award did not cover the loss. Priestley's advanced position upon scientific questions made him unpopular in England, and in 1794 he came to the United States, settling at Northumberland, Penn., where his death occurred. Among his writings not already named are "Disquisitions Relating to Matter and Spirit;" "Letters to Philosophical Unbelievers;" "History of Early Opinions Concerning Christ;" "Doctrine of Philosophical Necessity;" "General History of the Christian Religion to the Fall of the Western Empire;" "Institutes of Natural and Revealed Religion," and "Theory of the Human Mind." Priestley ranks high as an authoritative writer on scientific subjects, but his historical works on theology are not considered particularly valuable.

PRIM (preem), **Juan**, Spanish soldier and statesman, born in Reus, Spain, Dec. 6, 1814; died Dec. 30, 1870. He was a son of Pablo Prim, a military officer of rank, and at an early age entered the military service. In 1837 he was appointed colonel in the regular army for distinguished services in support of the infant Queen Isabella, and when the Espartero ministry was overthrown, in 1843, he was made general and created count of Reus. The democratic rising that followed soon after at Barcelona caused the government to appoint him to restore order, but his dilatory course led to his dismissal. He was accused of being implicated in the assassination of Narvaez, president of the council, in 1844, but his sentence to six years' imprisonment was revoked by the queen the following year. He entered the senate in 1858, and the following year commanded the Spanish reserve in the war against Morocco. In 1861 he secured command of the Spanish contingent, and was sent to command the Spanish army in Mexico, but soon withdrew his forces, a course afterward approved by the cortes of Spain. He led an insurrectionary movement against Queen Isabella in 1866, but its failure required him to flee for safety. However, he continued to direct the movements of the insurgents from Brussels until Queen Isabella was overthrown in 1868, and soon after he was appointed to the rank of marshal, thus becoming dictator of Spain. He offered the Spanish crown to Prince Leopold of Hohenzollern in 1870, which became the pretext for Napoleon III. to declare war against Germany. However, Leopold declined the proffered throne of Spain, and Prim induced the Italian prince, Amadeus, to accept it. Prim was wounded by an assassin on the day Amadeus landed in Spain, and died two days later.

PRIME, Samuel Irenæus, clergyman and editor, born in Ballston, New York, Nov. 4, 1812; died at Manchester, New Hampshire, July 18, 1885. He graduated from Williams College in 1829, studied theology at Princeton, and in 1833 was called to the Presbyterian ministry. In 1840 he was required to discontinue pastoral work on account of feeble health, and from that time until his death served as editor of the "New York Observer." He traveled in Europe several years and became famous for his "Irenæus Letters," and at various times contributed to "Harper's Magazine." Prime made large donations to several benevolent societies, and was officially connected with Williams College. Among his writings are "Travels in Europe and the East;" "Power of Prayer," and "Old White Meeting House."

PRIMROSE, an early-flowering plant native to the Alpine region of Europe and the temperate parts of Asia. The leaves are oblong and wrinkled, the flowers variously colored, and the roots perennial. Many different varieties have been described and are cultivated in gardens. Some are among the earliest flowering plants to blossom in the spring, such as the oxlip-primrose, cowslip-primrose, and common primrose.

PRINCE, the title applied to one possessing royal honor or power, as the sovereign of a country. The term is used also in speaking of the sons of sovereign rulers, and the title of princess is applied to the daugh-

ters. In some countries a territorial addition is made to the title, as prince of Orange, prince of Wales, and prince of Naples. The title is applied also to a member of a high

PRIMROSE.

order of nobility, as in Germany, Holland, Belgium, and Italy it is applied to the rank just below duke, though in other countries it is used to designate a rank superior to that of duke. Many members of ancient families in Europe bear the title of prince, though they are not immediately connected with a reigning house, but in England the term is applied only to members of the royal family.

PRINCE EDWARD ISLAND, a province of the Dominion of Canada, consisting of an island in the Gulf of St. Lawrence, which is separated from the mainland by Northumberland Strait. It extends from southeast to northwest for a distance of about 130 miles, is from four to thirty-five miles wide, and has an area of about 2,000 square miles. Its coast line is remarkably irregular, being indented by many gulfs and bays, and its surface is generally undulating, the greatest elevations being about 300 feet. Most of the coasts are precipitous cliffs of red sandstone, ranging from twenty to one hundred feet, and the soil is made up largely of a sandy loam, inclining in many places to a reddish color. The summers are pleasant and the winters somewhat longer and colder than those of Nova Scotia, but the climate is generally healthful.

Prince Edward Island was discovered by Sebastian Cabot in 1497, and was claimed by Champlain for France in the early part of the 17th century. The count of St. Pierre secured a grant of it in 1719 and made unsuccessful attempts to found colonies. It was seized by the British in 1745, but was restored to France by the treaty of Aix-la-Chapelle. It was finally annexed by Britain and placed under the administration of Nova Scotia in 1758, but soon after a separate government was established for it. The government is administered under a lieutenant-governor, with an executive council of six members and a legislative assembly of thirty representatives. The judicial department embraces an admiralty district court, a superior court, and several minor courts based on English law. A board of education appointed by the government has charge of educational matters, and the schools are supported partly by government grants and partly by direct taxation. Twenty periodicals are published in the province, and the libraries include about 15,000 volumes.

The province of Prince Edward Island is noted for its valuable fisheries, the total annual product being valued at about $1,125,000. The principal catches include lobsters, hake, herring, oysters, mackerel, and cod. Its soil productions include all the cereals and vegetables grown in a temperate climate. Horses, cattle, mules, swine, sheep, and poultry comprise the domestic animals. It has a considerable export of lumber and valuable timber, and manufactures of leather, machinery, clothing, utensils, and lumber products. The railroads are owned by the Canadian government. They aggregate 280 miles. There are 425 post offices in the province, and a large mileage of telegraph and telephone lines. Charlottetown is the capital and largest city; it has a population of 12,175. Other cities include Summerside and Georgetown. The total population in 1901 was 103,259, of which about 315 were Indians.

PRINCE OF WALES, the title conferred upon the heir apparent to the throne of Great Britain, and originally borne by the sovereigns of Wales. It was first conferred to please the Welsh at the time of the conquest of Wales, in 1284, by Edward I., on his son, who afterward became Edward II. The title was not borne by Edward III., but he conferred it upon his son, Edward the Black Prince, in 1343, and since that time it has been borne by the eldest son of the reigning sovereign. The title is bestowed by individual investment and is accompanied by the earldom of Chester, but the eldest son is by inheritance duke of Cornwall, a title first conferred by John of Eltham, the last earl of Cornwall, on Edward the Black Prince, in 1337. The prince of Wales as heir to the crown of Scotland also bears the titles of earl of Carrick, duke of Rothesay, lord of the Isles, baron of Renfrew, and prince and high steward of Scotland. The present prince of Wales, who is generally known as duke of Cornwall and York, received the title of prince of Wales from his father, Edward VII., in 1901.

PRINCETON (prĭns'tŏn), county seat of Gibson county, Indiana, twenty-six miles north of Evansville. It is surrounded by a fertile agricultural region, which produces cereals and fruits. It has good railroad facilities, and enjoys a considerable commercial trade. Among the manufactures are flour, agricultural implements, and clothing. The city has regularly platted streets and good municipal facilities. Population, 1900, 6,041.

PRINCETON, a town of Mercer county, New Jersey, on the Delaware and Raritan Canal, about forty-five miles northeast of Philadelphia. It is well located on a railway, has beautiful streets, good municipal facilities, and is noted as the seat of Princeton University. In 1777 Washington defeated the British forces at Princeton, and the continental congress held its session there in 1783. Population, 1900, 3,899.

PRINCETON UNIVERSITY, formerly the College of New Jersey, a celebrated educational institution, at Princeton, New Jersey. Though non-sectarian, it is closely allied to the Presbyterian denomination, and is for men only. It was founded in 1746 by charter from John Hamilton, president of His Majesty's Council, and was established with the view of providing ample means for the intellectual and religious culture of those desiring a liberal education, but more especially for the training of candidates for the ministry. The institution was opened at Elizabeth, in 1746, under the presidency of John Dickinson, who was succeeded on his death in the same year by Aaron Burr. In 1748 it was removed to Newark, where it remained till 1757, when it was removed to Princeton, and Nassau Hall was erected and named in honor of William III. The Presbyterians united to support the college in 1766, and in 1812 established the Princeton Theological Seminary, an institution still unconnected with it. Nassau Hall is the oldest college building, and is historic on account of being used as a barracks and hospital by the Americans and British at different times in the Revolution. In the battle of Princeton, on Jan. 3, 1777, a cannon ball passed through the walls, and in 1783 it was the meeting place of the continental congress.

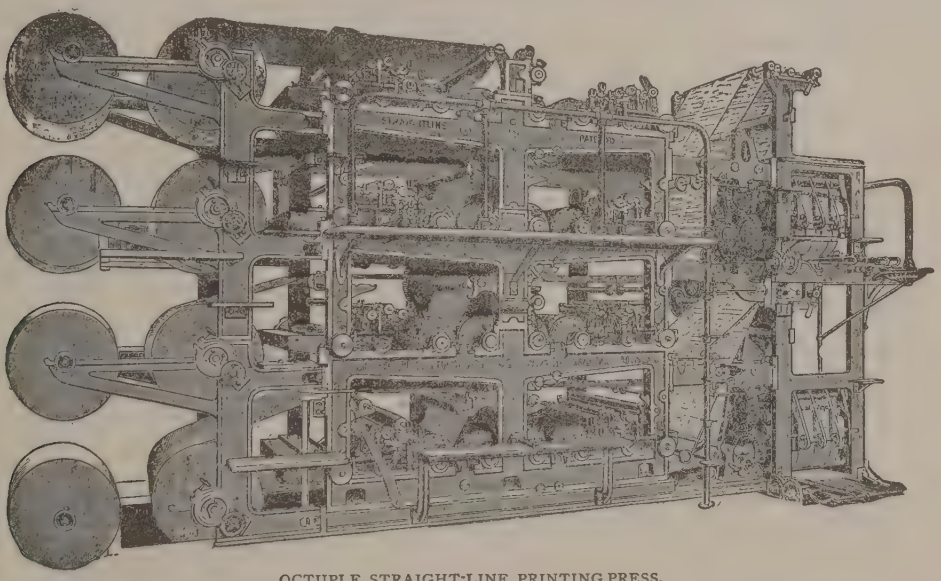
The second president of the college was the father of Aaron Burr, afterward vice-president of the United States, and other noted presidents include Jonathan Edwards and James McCosh. It was during the presidency of the latter that the institution reached its present importance, since it received endowments during that period of twenty years exceeding $3,000,000, and the departments of language and literature, philosophy, mathematics, and science were brought into development. John C. Green, in 1873, made a liberal endowment to establish the departments of civil engineering, general science, and electrical engineering. The graduates from Princeton include some of the most eminent men of America, among them James Madison, fourth president of the United States. There are adequate and advanced courses of study, 107 endowed scholarships, a library of 195,000 volumes, one hundred officers and instructors, and about 1,275 students. The periodicals issued include the "Princeton Review." It was founded in 1825 and was edited by Charles Hodge till 1872, when it was united with the "Presbyterian Quarterly," and is now published in New York.

PRINTING, the art of making matter for reading by means of type and the printing-press on cloth, paper, or other material. It is frequently referred to as "the art preservative of arts," since it supplies the most efficient means of recording knowledge for the use of future generations. The Chinese were the first to use movable types in printing, and there is evidence that they cut classics upon tablets and made impressions with them as early as 175 A. D. Several of these classics are still extant, while records published in the 6th century are numerous. Printed books came into common use in China in the 10th century. It is remarkable that little progress has been made by the Chinese since they first used wooden blocks for making impressions, and their printing is done quite like it was originally. From 5,000 to 10,000 movable characters are necessary, since each movable type represents a word instead of an elementary sound. Each character is supplied with ink by a brush and pressed upon the paper by the hand of the printer. In some of the larger offices forms are prepared, and the printing is done by methods much like those employed in an old-style Washington hand-press, while many of the books are printed from blocks on which each page is engraved by itself. In the 12th century blocks were used for ornamenting fabrics in Europe, while playing-cards were printed from blocks in the 14th century, and movable type for printing was invented about the middle of the 15th century.

The credit of inventing movable type is claimed by some for Lourens Coster, of Haarlem, Holland, but others think the invention due to Johann Gutenberg, of Germany. It is probable that both made inventions about the same time, but the art was first practically applied by Gutenberg, who published an edition of the Bible in Latin about 1445. Those claiming the honor for Coster show specimens of printing found at Haarlem, but it is singular that none of the early printed matters contain the names of those associated with the productions. Gutenberg was located at Mentz and Strasburg, and was supported financially by Johann Fust and Peter Schoeffer, who aided him in producing many of the earliest printed matters in the German. Soon after the art was carried to France, Austria, and

Italy, and in 1471 William Caxton introduced printing into England by setting up a press in Westminster Abbey. A strict censorship was established in England over the printers in 1530, largely because of the influence exercised by Cardinal Wolsey and others prominently connected with the church. The censorship was discontinued in 1694, after long years of limitation and persecution, and literature and learning immediately experienced a remarkable revival.

Antonio de Mendoza, viceroy of Mexico, founded the first printing establishment in America in 1536, and 103 years later the first printing-press was set up within the present territory of the United States, at Harvard College, in Cambridge, Mass. The first printing office in Philadelphia was founded in 1685, in New York in 1693, and



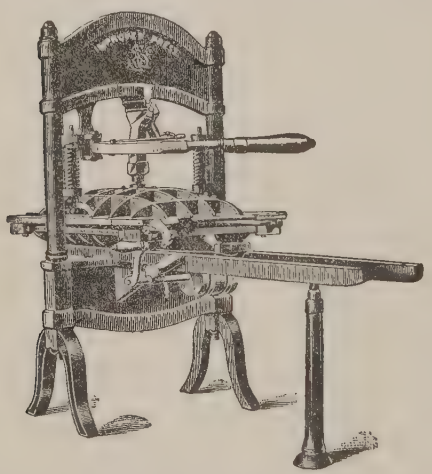
OCTUPLE STRAIGHT-LINE PRINTING PRESS.

other similar establishments followed in rapid succession. It may be said that printing consists of two parts, including the composition and the printing on the paper. Formerly all the composition was done by hand, and this is still the case in the smaller offices, but in the larger establishments much of the type is set up by machinery. In setting type by machines a single operator is able to accomplish as much as from three to five persons working by hand, the difference depending upon skill and the kind of machine used. Many different styles of type-setting machines have been invented, all of them being supplied with a keyboard similar to a typewriter. They may be divided into two classes: those like the Simplex setting the type, and those like the Mergenthaler setting matrixes and casting full lines to be used in printing. Improvements have also multiplied in the manufacture of printing-presses until now 100,000 perfected sheets may be printed in an hour on a single machine, instead of a few dozen, as was the case when printing was first employed.

The printing-presses used up to the 17th century consisted of a contrivance whereby the form of types was run under a screw-press, and by turning the screw by hand, similar to the screw of a letter-copying press, the pressure was applied, and after withdrawing the form, the printed paper was replaced by another sheet. William Jansen Blaen, of Amsterdam, invented a wooden press whereby it was possible to secure an impression by releasing a spring after placing the form of types in position, and this style of press continued in use until the latter part of the 18th century. The earl of Stanhope improved the hand press in 1800 by inventing a mechanical device whereby pressure was secured through the action of levers, and in 1818 George Clymer, of Philadelphia, made other improvements. His press is known as the Columbian, and the printing was done by bringing steel jaws together by means of a lever. It was operated by two men, and had a capacity of about 180 impressions an hour. The Washington press was invented in 1829. It is used extensively in country printing offices, and undoubtedly possesses the highest degree of mechanical completeness possible to be put into a press to be operated only by hand. While not rapid, it does its work with much accuracy.

Modern rapidity in printing may be said to date from 1811, when Frederick Konig, a

German printer, invented a cylinder press that had self-inking rollers and carried the paper on tapes through the machinery. He soon after improved the machine by adding the double cylinder and supplying the first apparatus ever made to propel a printing press by steam-power. This machine had a capacity of 1,800 impressions per hour. Soon after completing this improvement, in 1814, he devised additions whereby the paper, after being printed on one side by a cylinder, was placed in position and printed by a second cylinder on the other side. Many valuable improvements followed in rapid succession. The first notable improvement made in the invention of rapid-printing machinery may be credited to Richard M. Hoe, of New York, who made a rotary press in 1847 that had a capacity of 20,000 papers per hour, but the impressions were made only on one side. Sir Rowland Hill was the patentee of the first web perfecting-press in 1835; that is, a press capable of printing from a continuous roll of paper on both sides and cutting and folding the sheets. Walter



WASHINGTON HAND PRESS.

Scott, of Chicago, in 1879 devoted much attention to press improvements, and the Scott web perfecting-press may be regarded as one of several combining all the newer features of the best machines now used.

Modern perfecting-presses are mammoth machines and contain a multiplication of cylinders and forms in one general framework. The paper used is in one continuous roll, varying in length from three to ten miles, and is of the desired width for printing. It is placed on a rack at the end or above the press, and unrolled at any speed required by the machine. The paper is printed on both sides and cut, and is then folded and counted by the machine. The largest presses are fed by four rolls of paper, usually sixty-three inches in width, and the capacity of the most rapid is sufficient to turn out about 140,000 four-page papers in an hour. Among the best known perfecting-presses are the Campbell, Walter, Potter, Goss, Hoe, Cottrell, and Bullock. Printing in the larger offices is done almost exclusively from stereotyped or electrotyped plates made after setting the type by machines.

PRISM, a solid whose lateral faces are parallelograms, and its ends or bases form similar, equal, and parallel plane figures. The term is applied in optics to an instrument made of some transparent substance, as quartz, glass, or a prismatic glass case filled with transparent liquid. Such an instrument is usually of a form having equal and parallel triangular ends, and whose three sides are bounded by three parallel lines, extending from the three angles of one end to the three angles of the other end. A ray of white light is bent twice from its course in the same direction in passing through such a prism, once on entering and once on leaving, and the different colors are separated so as to form a spectrum. An achromatic lens is one that transmits light without separating it into its constituent colors. Light may be achromatized by joining prisms or other refracting bodies having opposite dispersing power.

PRISONERS OF WAR, the persons captured from the enemy in time of war, whether in military or naval operations. Prisoners of war were anciently treated with great severity, and those captured from the vanquished enemy were recognized as the property of the victors, who either reduced them to slavery or put them to torture and death. The practice of putting to death non-participants came into disrepute with the advance of civilization, but for many centuries all those claiming allegiance to the enemy were reduced to serfdom or slavery, and were either employed by the successful nation or sold into bondage to friendly states. It was the common practice in Greece for centuries to destroy the adult male population of the enemy, and enslave the women and children. In the early part of the 13th century A. D. more humane treatment of prisoners of war became general, and the exchange of prisoners was established as a common custom. All civilized nations now treat prisoners of war in a humane manner. They provide for the wounded and look after the burial of the dead. Prisoners of war are kept in safe confinement until peace is concluded, unless either exchanged for prisoners taken by the opposite army or navy, or given liberty on parole. Many instances are on record in which modern prisoners of war were treated severely, though in most cases on account of unavoidable circumstances or because the nations making the capture were to be classed among the savage or semi-civilized.

PRISONS, the institutions constructed and maintained by states or nations and designed as places of confinement for the

safe keeping of persons in legal custody. The prison system may be said to be a result of modern civilization, since it has followed in its completeness the abolition of slavery and the feudal system prevalent for many centuries in most countries of Europe. Instead of allowing the slave masters or feudal lords to institute systems of punishment, as was formerly the case, an offender against the peace and dignity of a state is now looked upon as a public charge, and he is held for trial in a jail or bridewell, and afterward sent to a workhouse, house of correction, reformatory, or penitentiary. The punishment is not designed to cause the prisoner to suffer physically or mentally, but all civilized nations are taxing themselves to provide prison systems that shall be more reformatory in character, not only separating the offender from the public as a benefit to the public but also for the purpose of reforming the individual and leading him to become and remain a law-abiding and useful citizen.

In some countries death punishment is inflicted for the aggravated cases of criminal conduct, but many leading writers and students are beginning to look upon crime as a disease. According to this view the inclinations toward crime are inherited very much the same as other traits of character or tendencies toward physical imperfections. Whether this or some other humane view of those inclined to crime is taken, it is certainly hopeful to notice that many reforms are being effected in the treatment of prisoners and the construction of houses of confinement. However, in some county jails and minor prisons much imperfection still exists; many of these institutions are not only illy constructed, but their management is open to criticism. In many counties the jails are large buildings, and are provided with well planned residence additions for the sheriff or bailiff. All the modern buildings of this kind are provided with separate cells for the confinement of youths and women, while in others the adult male prisoners are consigned to separate departments with the view of classifying them according to the nature of their character and reputation. The number of county jails in the United States is about 2,475, and the number of federal and state prisons and penitentiaries is seventy-five. The last census gives the number of prisoners in state prisons and penitentiaries at 47,500; in county jails at 20,500; and in city prisons at 4,250. Besides these are many workhouses and other correctional institutions that contain a considerable number of inmates.

Modern progress in reforming prison practice may be said to date from the early part of the 18th century, though in some countries dark dungeons were maintained long after that, in which prisoners were confined under the most objectionable circumstances. In some cases the prisoners perished after a short period of confinement. The Philadelphia Society for Assisting Distressed Prisoners dates from 1776, and may be said to be the first efficient organization in the world designed to reform prison practice. Previously the benefits of separating prisoners were not recognized, but this and other similar societies inaugurated reforms in prison construction and discipline, and in the early part of the 19th century many of the states followed Pennsylvania in abolishing capital punishment, except for murder in the first degree. In 1829 the penitentiary at Philadelphia adopted the so-called Pennsylvania System, under which some classes of prisoners were permanently secluded from others. This system has been superseded almost universally by the Auburn System, by which convicts are separated by night and required to labor in silence with associates by day.

In 1825 the first institution for juveniles was established in New York, while Ohio was the first state to provide separate places of detention for juveniles, founding a reformatory for boys at Lancaster in 1858, and one for girls at Delaware in 1878. These institutions are now generally called industrial schools, and are maintained in most of the states. Those confined there are taught the common school branches and various industrial pursuits, their labor being utilized quite largely to support the institutions. The chief occupations in which prisoners are employed include making brooms, furniture, utensils, buttons, boots and shoes, clothing, and farming implements. In some counties prisoners are employed in mining, carpentering, building railways and highways and constructing various other public improvements. Some of the states lease prisoners to those bidding highest for their labor, but this system is gradually going out of use. While the employment of prisoners is looked upon as a benefit to those in confinement, it should be the constant aim of the government to employ them at work not coming in competition with free labor, since otherwise the system interferes with those having to support their families and the state. The marking system is employed in all prisons to a varied extent, and under it those under confinement may by good conduct and industry shorten considerably the term of confinement. An examination into the condition of prisoners in the United States has disclosed that seventy-five per cent. have no trade, twenty-four per cent. are unable to read and write, and the average age is about thirty years.

PRIVATEER (prī-vā-tēr'), a vessel owned and officered by private individuals, and licensed by letters of marque to carry on maritime war against the commerce and ships of an enemy. More than 400 privateers were fitted out by the British colonies to ravage the commerce of France in the colonial wars of America, and these inflicted great

damage along the coasts of the French possessions in Canada and the West Indies, and the coast of France. The continental congress authorized privateers in 1776, and before the end of that year they captured 342 British vessels. Since the owners and crews of privateers were given a large share of the prize property lawfully captured by their vessels, many sailors were attracted to the privateer service throughout the Revolution. In 1778 an American privateer captured the British fort of New Providence, in the Bahamas, and a sixteen-gun man-of-war. More than 500 British vessels were captured by American privateers in the War of 1812, and the service became so well organized that immense damage was done to the British on the coasts of the West Indies, the Canary Islands, and even Great Britain. In 1856 the great powers of Europe united in the Declaration of Paris, whereby it was mutually agreed that privateers should no longer be licensed, but the United States and several other nations have never accepted the treaty.

PRIVET (prĭv'ĕt), an ornamental, bushy shrub native to Europe, but naturalized in many sections of the United States. The several species include evergreen or nearly evergreen varieties. Several varieties are used for hedges. They have opposite entire leaves, small white flowers with a pleasant odor, and yield a small, globular berry, mostly black, but sometimes yellow or greenish in color. The wood is of value for making shoemakers' pegs and for turners' products, while the berries yield dyes and are of service as bird food.

PRIVY COUNCIL (prĭv'ў), the council of the sovereign of Great Britain. It is constituted of persons nominated by the crown at will, and of others on account of their rank or position. The privy council originated in the Norman period, but since the duties of government were assumed by the cabinet its political importance has been greatly diminished. Among the members of the privy council are the prime minister, members of the cabinet, the archbishops, the bishop of London, the lord chancellor and chief judges, the commander-in-chief, the great officers of state, the speaker of the house of commons, and numerous dignitaries who are or were in responsible offices under the crown. The crown is limited in making nominations for the privy council to natural-born subjects, but no patent or grant is necessary. The lord president of the council is its legal head, and the debates and reports from the council to the crown are under his direction. At present the privy council is rarely consulted, since its offices have been superseded largely by the cabinet. Among the important functions exercised by it in recent times are the examination of George III. as to sanity in 1788, and the determination whether Queen Caroline as queen consort had a right to the crown in 1821. "Right honorable" is the title of a privy councilor. All the proceedings of the body are conducted in secrecy.

PROA (prō'ȧ), a sailing-boat about thirty feet long and three feet wide, used extensively by the natives of the Ladrone Islands and other islands of the Malay Archipelago. It is built with a stem and stern of similar structure, and may be sailed equally well in either direction. One side is flat, on a line from the stem to the stern, while the other side resembles an ordinary boat. The vessel is prevented from tipping by a frame extending to leeward, and in some boats the out rigger extends to both sides. Proas are of various sizes, and their shape makes them capable of swift sailing under an ordinary pressure of wind upon the sail.

PROCTER, Adelaide Anne, poetess, born in London, England, Oct. 30, 1825; died there Feb. 3, 1864. She was a daughter of Bryan W. Procter, secured an education in London, and at an early age devoted much time to poetic writings. Her productions include many excellent works still extensively read, among them her "Lyrics" and a volume of legends.

PROCTER (prŏk'tẹr), **Bryan Waller**, poet and prose writer, generally known as Barry Cornwall, born in London, England, Nov. 21, 1787; died Oct. 4, 1874. He studied at a boarding-school, and later became a classmate with Lord Byron and Sir Robert Peel at Harrow. In 1807 he entered upon a course of legal studies in London, and contributed to the "Literary Gazette." The death of his father, in 1816, brought him into possession of a small estate, and till 1820 he devoted his time largely to soliciting, but in the latter year he began writing under the pseudonym of Barry Cornwall. He was admitted to the bar in 1831, and became commissioner of lunacy the following year, a position he filled successfully till his resignation in 1861. Procter does not hold the highest rank among the writers of his time, but was particularly successful as author of many excellent songs and a number of tragedies. His writings of special note include "English Songs;" "Sicilian Story;" "Flood of Thessaly;" "Dramatic Scenes;" "Memoir of Kean;" "Marcian Colonna," and "Memoir of Charles Lamb."

PROCTOR, Richard Anthony, noted astronomer, born in Chelsea, England, March 23, 1837; died in New York City, Sept. 12, 1888. He graduated from Cambridge in 1860, became a fellow of the Royal Astronomical Society in 1866, and of the London King's College in 1873. In 1873 he made a lecturing tour of America. After observing the transits of Venus in 1874 and 1882, he published many valuable illustrated articles on stars. Proctor was not only a pleasing and popular lecturer, but an efficient and attractive writer. His writings cover numerous topics in relation to astronomy and extensive travels in America, southern

Europe, and Australia. His death resulted from yellow fever contracted while in Florida. A monument in the form of an observatory was erected to his memory near San Diego, California, in 1890. Among his best known works are "Other Worlds than Ours;" "Great Pyramids;" "Myths and Marvels of Astronomy;" "Light Science for Leisure Hours;" "Saturn and Its System;" "Half Hours with the Telescope;" "Old and New Astronomy," and "Orbs Around Us."

PROHIBITION PARTY (prō-hĭ-bĭsh'ŭn), a political organization of the United States, first established as a national organization in Chicago on Sept. 1, 1869. The prohibition movement in the United States dates from 1812, and the first law providing for the prohibition of the liquor traffic was enacted in Maine about 1851. Vermont and Rhode Island passed a similar law in 1852; Connecticut followed in 1854, and the states of New Hampshire, New York, Michigan, and Iowa in 1855. These laws were more or less modified or repealed, but the movement continued to gain many adherents. James Black of Pennsylvania was nominated for president in 1872. He received 5,608 votes, and was the first presidential candidate of the prohibition party. Green Clay Smith received 9,522 votes for president in 1876; Neal Dow, 10,305 votes in 1880; John P. St. John, 150,369 votes in 1884; Clinton B. Fisk, 250,290 votes in 1888; and John Bidwell, 279,191 votes in 1892. The party was divided on the money question in 1896, the two opposing factions being known as prohibitionists and the national party. The former made prohibition the single issue, and its candidate for president, Joshua Levering, received 130,560 votes; while the latter supported prohibition, bimetallism, and other issues under the leadership of Charles E. Bentley, who received 14,392 votes. In 1900 John G. Woolley was the candidate for president, receiving 207,368 votes. Thus far the prohibition element has been much stronger as a political factor in county and state elections than in national contests, though there is a growing sentiment in favor of making the temperance question an issue of national importance, since many regard prohibition by locality only a step in the general movement.

PROMETHEUS (prō-mē'thē-ŭs), in Greek legends, the son of Iapetus, brother of Atlas and of Epimetheus, and father of Deucalion. Hesiod, the oldest of Greek poets, relates that Prometheus was a Titan, and that he formed man out of clay, into whom Athene breathed the spirit of life. He was pleased with the being thus formed, and taught him astronomy, the alphabet, mathematics, and a number of the arts. Zeus denied mankind the gift of fire, but Prometheus brought sparks from the chariot of the sun and gave that necessary element to man. This so aroused the anger of Zeus that he determined to be revenged, first on mankind and then on Prometheus. He accordingly instructed Vulcan to mold a beautiful woman out of clay, determining that through her trouble and misery would be brought into the world, but, when Vulcan had completed his work, Zeus found her so beautiful that he endowed her with many special gifts. However, Prometheus was chained by Vulcan to a rock of the Caucasus, where a vulture fed upon his liver by day, though Zeus permitted it to grow anew every night. At length Hercules was moved to destroy the vulture and unlock the chains, and Prometheus was permitted to return to Olympus. The story of Prometheus has entered largely into sculpture and literature, the most notable productions of the latter being "Prometheus Bound," by Æschylus, and "Prometheus Unbound," by Shelley.

PROOF READING, the art of reading proof sheets made in printing, and indicating the necessary corrections by means of particular signs or marks. In printing it is necessary to take a rough impression from type, after the compositor has set an article, or part of an article, for the purpose of noting errors to be corrected. This is necessary in order to secure correctness in spelling, punctuation, capitalization, paragraphs, pages, chapters, etc. It is not customary to read proof sheets of matters published in newspapers more than two times, but in book-work from three to five readings are common. The first impression taken is called the first proof, and is corrected by the compositor or manager of the printing office. This is used as a guide in making corrections in the type, and a second or clean proof is made to be examined by the editor, who notes any alterations desired and instructs finally as to the printing. In the case of book-work a third or press proof is taken and read by one or more individuals, all exercising care that the matter is properly noted and marked for revision. Proof reading is a difficult art, and it requires remarkable care and ability to note all the matters demanding attention in an article or a part of it. It is not sufficient to examine every sentence, but every word and letter must be carefully observed, that nothing inaccurate may pass into print.

PROPHETS (prŏf'ets), those who speak as the inspired representatives of a Divine Being, and who are mentioned in the Scriptures as teachers sent by God to utter predictions of future events. The first mention made of prophets occurs in Genesis, where Abraham is spoken of in that relation, and it is implied that Moses was one. However, the more typical prophets began with Samuel, who was also a civil ruler, but the prophetic order did not fully develop until the separation of the Israelites into two kingdoms. It is thought that the order of prophets partook of the nature of a school, and that young men of the different tribes were admitted into membership, who received

instruction in sacred poetry and music, and in the law. Judah, being generally faithful to Jehovah, did not develop many prophets, but in Israel the prophets were prominent and influential, and devoted much time and energy to opposing apostasy and moral depravity. Elijah and Elisha were among the early prophets who left no written works, but the later prophets committed their messages to writing.

Sixteen different prophets of the later period of the Old Testament left books that became recognized as a part of the Old Testament canon, and these are divided into the four greater and twelve lesser prophets. The four greater prophets are Isaiah, Jeremiah, Ezekiel, and Daniel; and the twelve lesser, Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah, and Malachi. Hosea, Amos, and Jonah belong to the kingdom of Israel as distinct from the kingdom of Judah; Joel, Isaiah, Jeremiah Obadiah, Micah, Nahum, Habakkuk, and Zephaniah belong to the kingdom of Judah; Ezekiel and Daniel to the period of captivity; and Haggai, Zechariah, and Malachi to the period after the return from captivity. Some of the prophets are mentioned as being particularly skilled in using the psaltery, harp, cymbal, and pipe. The higher classes of prophets had inferior prophets to attend upon them and look after their means of subsistence. Many of them were married and had families, among them Moses, Hosea, and Isaiah. The wife of Isaiah is spoken of as a prophetess.

PROSERPINE (prŏs'ẹr-pīn), a Greek goddess, daughter of Zeus and Demeter, who was usually called Persephone by the Greeks. It is related that she was gathering flowers in a meadow of Sicily, when a yawning abyss opened at her feet, and she was carried by Pluto to the gloomy realms over which he reigned. When Demeter became conscious of her loss, she was stricken with intense grief and wandered nine days and nights without tidings from her child. On the tenth day she learned by consulting Helios that Pluto had carried her daughter to the under world, and after imploring him with great fervor, it was agreed that Proserpine should spend one-half of every year with her mother and the heavenly gods, and pass the rest of the year with Pluto beneath the earth. Writers have spoken of this legend as indicating the planting of seeds in the earth, which, after about nine days, send the tender plants forth, while the matured seeds remain about one-half year in the granary.

PROTAGORAS (pro-tăg'o-rạs), Greek philosopher, born in Abdera, in Thrace, about 481 B. C.; died about 411. He was a contemporary of Socrates, and was the first to assume the title of Sophist. He admonished to educational effort, and taught that the measure of all things is to be found in man. All his works are lost. Some were burned at Athens before his death, and he was banished on a charge of being an atheist. It is thought his death occurred at sea while proceeding to Sicily. His chief work is a treatise entitled "On the Gods."

PROTECTION (prō-tĕk'shŭn), an economic theory by which governments seek to limit imports for the benefit of home manufacturers. The principle of protection was recognized distinctly by the first tariff levied in the United States, in 1789, though the amount of protection was moderate. It has been the policy of the government to combine a protective tariff tax with the plan of internal improvements at national expense, and such a policy has been sustained during all its history, except in the period from the establishment of the Walker tariff in 1846 to that of the Morrill tariff of 1861. Writers on political economy are much divided as to the practical effect of a protective tariff. It is claimed on the one hand that it is absolutely necessary to protect home industry to enable the producers of a protected article to receive in return for their services a fair remuneration. Those taking the opposite view assert that the uniform effect of the policy is to render the article produced both dear and bad. Tariff duties are usually of two classes—protective and prohibitory. A protective tariff aims to provide conditions under which articles of foreign and home manufacture can compete in the market on terms nearly equal, while a prohibitory tariff has the effect of excluding foreign products from the market. The protective system was first proposed on a large scale by an Italian in the suite of Catharine de Medici, and soon after legislation developed whereby retaliatory tariffs were levied in a number of countries, as the tariff of England in 1692, which taxed the goods imported from France on an average about seventy-five per cent. In the period between 1818 and 1824 all bounties to manufacturers were abolished in Britain, and this, with the repeal of the corn and navigation laws, ended the protective policy in that country. In the United States a large proportion of the people still favor a protective policy, though a considerable minority is in favor of free trade. See **Tariff**, **Free Trade**, etc.

PROTECTOR (prō-tĕkt'ẽr), the official title of one appointed in England as a regent of the kingdom during the minority or incapacity of the sovereign. The earl of Pembroke was among the first protectors, serving in 1216 during the minority of Henry III. Oliver Cromwell assumed the title of lord protector in 1653 over England, Ireland, and Scotland, serving till 1658, and was succeeded in that capacity by Richard Cromwell.

PROTEIDS (prō-tē'ĭdz), the name of several important animal and vegetable compounds, some of which are found in solutions or viscous solids in nearly all animal and

vegetable organisms. They are formed exclusively in plants, and undergo but slight alteration when consumed as food and stored up by animals. The constituents of proteids are similar to those of protein, containing carbon, hydrogen, nitrogen, oxygen, and sulphur.

PROTESTANTS (prŏt'ĕs-tants), the designation applied to the Christians who deny the authority of the pope, and hold to the right of private judgment in the matter of religion. The name was first applied to the princes and other adherents of Luther, who, at the second council of Spires, held on April 19, 1529, protested against the decree of the majority, representing the Roman Catholic states of Europe. This decree involved a virtual submission of the reformers, who not only dissented from the decree, but appealed to a general council. Among the leading princes who followed the leadership of Luther were Landgrave Philip of Hesse, the Electors George of Brandenburg and John of Saxony, Prince Wolfgang of Anhalt, and Princes Ernest and Francis of Brunswick-Luneburg. Many imperial cities joined the movement under Luther. They were Ulm, Strasburg, Nuremberg, Constance, and ten others.

The Protestant churches include the denominations not Roman and Greek Catholic, embracing the Lutheran, Presbyterian, Methodist, and other ecclesiastical bodies, though several branches of the Anglican Church do not accept the classification as historically correct when applied to them. Among the fundamental doctrines of Protestantism are the supremacy of the Bible above bishops and councils; individual responsibility; justification by faith, and freedom within the authority of the Bible of conscience and worship. There are numerous branches of Protestant churches more or less widely distributed, though the Teutonic peoples of northern Europe and their descendants have had and still make up the largest membership. It has always been difficult for Protestantism to make material advances among the Latin peoples of southern Europe and their descendants. The Protestant churches of the world have a membership of 163,300,000.

PROTEUS (prō'tē-ŭs), the Greek sea myth known as "The Old Man of the Sea," and regarded a son of Neptune. He is represented as a marine deity, who tended the flocks of seal at the bottom of the sea, but at the hour of noon came up to the island of Pharos, on the Egyptian coast. It was his custom to slumber beneath the grateful shade of the rocks while surrounded by flocks of seals, and his coming was awaited with interest, since he possessed the gift of prophecy. Those consulting him were obliged to hold him in their embrace, since he endeavored to escape, and for that purpose changed himself into various hideous forms and objects. When at last wearied from effort to escape, he foretold future events, and again dived to the bottom of the sea, accompanied by the animals he tended.

PROTOPLASM (prō'tō-plăz'm), the elementary living matter of plant and animal structures. Its chemical constituents are about eighty per cent. of water and about twenty per cent. of solids, chiefly proteids. The proteids found in protoplasm consist mainly of peptones, albumoses, and globulins, with small quantities of salt, fat, and carbo-hydrates. All organized bodies contain protoplasm. It is seen in its simplest form in the lowest animals, as in the protozoa. Protoplasm is transparent and can absorb, excrete, secrete, grow, move, and multiply. It is not elaborated from minerals by animals, but they derive it from plants or other animals by converting the dead into living protoplasm. However, plants derive it from the air and mineral substances, thus providing a supply of this essential substance for the use of animals. Huxley spoke of protoplasm as the physical basis of life, since it seems to be the original life principle, and is found in all organized bodies.

PROTOZOA (prō'tō-zō-à), the lowest group of animals, including a large number of organisms of the simplest type. They are variously ranked and limited by writers, but generally include all organisms consisting of a single cell or group of cells not separable into different tissues. The food is taken into the protoplasm, the name applied to their nearly structureless substance, either by a specialized mouth, or by any part of the cell substance, in the form of particles. As a rule they are incapable of assimilating nitrogen, since their cells consist largely of nitrates or carbonates. Reproduction is usually by spore formation, fission, or gemmation. They are almost exclusively aquatic animals, though a few species inhabit the bodies of other animals, and most of them are so small that they may be observed only by the microscope. Sponges belong to the protozoa, and constitute the largest form.

PROUDHON (prōō-dōn'), **Pierre Joseph,** political and economical writer, born at Besançon, France, July 15, 1809; died in Paris, France, Jan. 19, 1865. He was the son of a cooper and received the rudiments of an education at the college in his native town, and in 1828 entered a printing office as proof reader. While in this position he acquired considerable ability as a linguist, and published a work on French grammar of such merit that he was awarded a pension by the Academy of Besançon. In 1840 he published a work on political economy, in which he advanced many radical theories and treated property as the result of theft. This and other similar works caused him to be prosecuted, but he was ultimately acquitted. From 1843 to 1847 he superintended a water transport system at Lyons on the Saone and Rhone rivers. He settled in Paris in the latter year, and became a

leader of the Revolution of 1848 by publishing an aggressive journal devoted to extreme democracy and socialism. His paper was suppressed by the government, but he was chosen by a large vote as a representative from the department of the Seine in the constituent assembly. The extremely radical views expressed by him caused a majority of the members to seek to suppress his addresses in rendering them inaudible and ineffective by making various disturbances. However, he reached the masses by publishing three daily papers in Paris, and in 1849 was imprisoned on a three years sentence on the charge of inciting public disturbances. In 1852 he attained his liberty and settled in Belgium, where he continued publishing addresses and works on political and economical reforms. Though radical, Proudhon was influential as a writer and speaker, and his fines and much of his expense were defrayed by popular subscription.

PROVENCAL (prō-vän-säl'), the name used to designate the different Romanic dialects formerly spoken and written in the south of France, which are employed at present by country people in the Provence province and adjacent regions. Collectively they are classed as one of the six chief Romance or neo-Latin languages, and sometimes as a dialect of French. Provençal is inflected more than the other dialects of its class, and was the first to be fixed grammatically. The earliest writings in the Provençal language date from the ninth century, and in the 11th and 12th centuries its literature spread over a large portion of southern France and into northern Italy and Spain. Its widest use and highest development were reached in the latter part of the 12th century. The highly inflectional properties make it particularly adaptable to the production of poetic forms, though in modern times it is more simply inflected than in the ancient, and a considerable number of French words and terms have been incorporated with it. Provençal literature was revived notably in the 19th century.

PROVERBS (prŏv'ẽrbs), the wisdom of experience condensed into brief and pithy sayings. Many definitions have been applied by numerous writers, and much energy has been devoted to forming and collecting proverbs from the different races and ages. Aristotle spoke of proverbs as remnants that were saved from the ruins of ancient philosophy on account of their shortness; Agricola considered them short sentences into which the ancients compressed life; Erasmus regarded them as well known forms framed from somewhat uncommon sayings; and Bacon regarded them as the genius, wit, and spirit of a nation. Sayings that contain wit and truth, but are applicable only in one line of conversation or to illustrate a specific idea, are not properly proverbs, since a proverb must be a saying that has long been in general use and has been accepted by the people. It may be said as a rule that a proverb originates of its own accord by the sense and method contained in it, and usually reflects the people with whom it originated. Thus a proverb does not originate from any one individual, but springs into use by popular approval, and ultimately passes from nation to nation until it becomes the heritage of the race. Many of the proverbs in general use are of very early origin, some of them coming from Arabia and Persia, though as a rule it is quite difficult to determine whence the best and most popular proverbs now in use first sprang into existence.

The first collection of Arabic proverbs dates from the 11th century, and different nations have made similar collections and adopted many of those drawn from other sources. It may be said that the Spanish people have the largest number of proverbs, estimated at about 25,000. The literature of Iceland is rich in proverbs, and so is that of the German and Scandinavian languages. The Arabs have the largest number of proverbs of Asiatic nations, but those of Persia, Hindustan, and Turkey are also numerous. Such proverbs as "Time is money;" "God tempers the wind to the shorn lamb;" "Hit the nail on the head;" "Strike while the iron is hot;" "Put the matter in a nutshell," and many others are practically in universal use. The Book of Proverbs is a part of the Bible and contains a collection of popular sayings, but the book is not constituted exclusively of proverbs. It is generally attributed to Solomon, though many of the sayings do not appear to be founded solely on his own experience, but rest at least partly on the shrewd observation of the nation at large. It includes many sayings that were coined in earlier times. Many of the proverbs drawn from this book are in popular use, and the New Testament in many instances quotes directly from it.

PROVIDENCE (prŏv'ĭ-dens), a city and the capital of Rhode Island, in Providence county, on Narragansett Bay. It is conveniently connected with other trade emporiums by numerous railroads, has an excellent harbor, and is one of the largest and wealthiest cities of New England. Commercial enterprises were formerly its predominant interest, but it has made remarkable strides as a manufacturing center, and now takes high rank among the producing cities of America. It has about 2,125 industries, which represent a capital of $75,000,000 and employ 45,000 persons. Among the products are jewelry, silverware, cotton and woolen goods, engines and boilers, boots and shoes, clothing and hosiery, tobacco products, hardware, sewing machines, firearms, edged tools, and stoves. The city has an excellent system of street railways, which includes branch lines to all parts of the city and the adjacent suburbs. Electric and gas lighting, waterworks, sewerage, street pave-

ments, and a public library are among the municipal facilities. It is supplied with an excellent system of public schools, including all grades from the kindergarten to the high school, and there are many hospitals, charitable associations, and institutions of higher learning. Among the principal buildings are the county courthouse, the state house, the soldiers' and sailors' monument, the Dexter Asylum for the Poor, and a number of state penal and reformatory institutions. Providence is the seat of Brown University, a Baptist institution founded in 1764 as Rhode Island College. It has a library of 105,000 volumes, an adequate system of courses, and is attended by about 1,000 students. Other noteworthy educational institutions include the Friends School, the Catholic Academy of the Sacred Heart, the Berkeley School, and several historical and educational associations. Providence is situated on a tract of land settled by Roger Williams in 1636, which soon became the seat of a large commerce and trade, but it suffered considerably in the Revolution of 1775-83. When considered from the standpoint of population, it may be classed among the wealthiest cities of America. It ranks as the twentieth city of the United States. Population, 1900, 175,597.

PROVO CITY (prō'vō), a city in Utah, county seat of Utah county, on the Provo River, about forty-five miles south of Salt Lake City. It is surrounded by a fertile farming region, and has a large trade in cereals, live-stock, and merchandise. The manufactures include flour, leather, machinery, and woolen goods. Electric lights and waterworks are among its municipal facilities, and, being easily accessible by railway, it is a favorite resort for summer tourists. Provo City is the seat of the state insane asylum. Population, 1900, 6,185.

PRUNES, the dried fruit of any one of several varieties of the common plum. Prunes are produced extensively in California and various parts of southern Europe, and are known in the market from the country producing them, as California, Spanish, German, Turkish, and French prunes. They are used extensively as a food, after being prepared by stewing, and in some countries brandy is distilled from them.

PRUNING, the act of cutting off superfluous branches, shoots, or roots of trees and shrubs for the purpose of bringing the plants to a particular form, or with the view of strengthening the growth of the parts remaining. Many plants throw out unprofitable growths, thus decreasing the production of flowers and fruit, while some assume a form either undesirable or illy calculated to withstand the effect of wind and weather. The ultimate result of judicious pruning is an increase in the vitality of the plant and in the size and quality of its fruit. This result is due to the removal of excessive branches, thus exposing the inner limbs to a greater amount of sunlight and causing a larger quantity of vital sap to flow to the flowers and fruit. In some countries forest trees are pruned with the view of influencing the growth of their trunks as to size and direction, while in flower culture plants are trimmed to increase the size and vigor of their ornamental parts. Root pruning is generally effected to increase the beauty and size of flowers. Both classes of pruning depend upon the plants to be improved, since the removal of a large number of roots and branches may impair general growth. Pruning out of season is particularly harmful.

PRUSSIA (prŭsh'ą), in German **Preussen**, a powerful kingdom of Europe, and the most important state of the German Empire. It is situated in the northern part of Germany, and contains the following thirteen provinces: East Prussia, West Prussia, Brandenburg, Pomerania, Posen, Silesia, Saxony, Schleswig-Holstein, Hanover, Westphalia, Hesse-Nassau, Rhenish Prussia, and Hohenzollern. Brandenburg is the largest province, area 15,402 square miles; and Hohenzollern the smallest, area 480 square miles. The total area is 134,441 square miles, and the population 35,500,000. About 75 per cent. of the people are Protestants, and practically all belong to the German race, the only exception being 2,235,000 Poles and 400,000 Jews. Berlin is the capital and largest city. Other cities of importance are Breslau, Cologne, Danzig, Düsseldorf, Frankfort, Hanover, Konigsberg, Magdeburg, Altona, Elberfeld, Barmen, Stettin, Krefeld, Aix-la-Chapelle, Aachen, and Halle.

The western part of Prussia is more or less hilly and mountainous, but the general surface of the vast territory lying toward the north and east is included in the plain stretching from the Ural Mountains to Holland, and its surface is quite level or undulating. The general drainage is toward the north into the Baltic Sea and the North Sea. Among its principal rivers are the Weser, Elbe, Oder, and Vistula, all having their source near the southern boundary, while the Nieman flows through the northeastern part and the Rhine through the western part. Other streams include the Eider, Ems, and Pregel. The principal rivers have been improved for navigation by a network of canals, and all the different parts of the kingdom have an adequate railway service. Formerly the region was covered by a vast expanse of forests, and there is still a timber surface of about twenty-two per cent. Forestry has been made a particular branch of study and is an important industry, the production of valuable varieties of timber being a source of great wealth. Much of the soil is exceedingly fertile, though in some portions marshes and peat-moors are extensive, while in others the soil is of a light, sandy formation, as is the case in both East and West Prussia. The Rhine valley is noted

as the most picturesque and fertile part of Germany, and it is famous on account of its fine orchards and vineyards.

Among the cereals produced in Prussia are wheat, barley, oats, and maize, while the vegetables include potatoes, sugar beets, and garden products. It has a considerable production of tobacco, flax, hemp, and domestic animals, particularly horses, cattle, sheep, swine, and poultry. Mining is an important industry, the products including coal, peat, iron, zinc, lead, copper, cobalt, silver, salts, copperas, manganese, and nickel. Among the manufactures are beet-root sugar, tobacco products, cotton and woolen goods, chicory, scientific instruments, machinery, ships and sailing vessels, engines and boilers, and utensils. The railroad and canal trade is of growing importance, and its seaports have been noted as centers of commerce for centuries. There is a vast trade in textile fabrics, chemicals, metal wares, leather, glass, coal, stoneware, timber, and live-stock. The port cities of greatest importance are Stettin, Flensburg, Konigsberg, Memel, Stralsund, Kiel, and Pillau on the Baltic, and the North Sea port of Altona. Prussia is particularly famous on account of its splendid educational institutions. Attendance at all the public elementary schools is compulsory, and they are supported by local and state aid. The period at which children are required to attend ranges from six to fourteen years, and the population within this limit aggregates 5,750,000. Among the noted institutions that have made Prussia famous are the ten universities of Berlin, Halle, Göttingen, Konigsberg, Greifswald, Münster, Breslau, Kiel, Bonn, and Marburg. These institutions have about 1,250 professors and teachers, and an attendance of 15,500 students. Each of these institutions is equipped with modern apparatus, museums, and historic libraries. The Royal Library at Berlin is one of the most famous in the world, having 1,000,000 volumes, and about 25,000 manuscripts. Many literary, scientific, and artistic schools and societies are maintained, among them the Academy of Arts founded in 1699, the Antiquarian Society of Stettin, the Royal Museum of Arts of Berlin, and the Breslau Historical Society. It is but a result of the excellent educational policy of the government that the general public is devoted to the support of these and kindred societies, and many magazines and other periodicals.

It is thought that when the Phœnicians visited the North and Baltic seas, in the 4th century B. C., they found Slavonic tribes occupying the region at present comprised in northern Prussia, but little is known of these people until in the 10th century, when they are mentioned by a number of writers as Borussi or Porussi. Their fear of losing independence caused them to battle against the advance of Christianity with marked determination, and in 997 Bishop Adalbert of Prague was martyred by them. The Knights of the Teutonic Order of St. George entered upon a crusade against them in the middle of the 13th century and formally established the Christian faith. A considerable part of Prussia was governed by the Teutonic Knights under a despotic form until 1466, when their power was overthrown by the allied forces of the Prussians and Poles. At that time West Prussia became a part of Poland and East Prussia was made a Polish fief, but in 1618 the duchy of Prussia was established and John Sigismund, elector of Brandenburg, became duke of Prussia, and since that time the government has been vested in the Hohenzollern-Brandenburg dynasty.

Prussia was a noted seat of action in the revival of learning and the center of activity in the Reformation. It was connected more or less prominently with the early German Empire that included Austria and Italy, and took a large part in the contests that led to the overthrow of Napoleon in 1815. Its greatest importance in modern times dates from 1866, when it led an aggressive movement against the power of Austria, which not only consolidated many of the German states with Prussia, but led to the organization of the German Empire after the Franco-German War of 1870-71, the Prussian king assuming the title of emperor of Germany. The government is a constitutional monarchy, and the crown is hereditary in the male line. The king is assisted by a council of ministers appointed by royal decree. It has a legislative assembly called the landtag, composed of two chambers, the herrenhaus and abgeordnetenhaus. The upper chamber has a membership of about fifty, including princes, titled noblemen, and life peers; while the second chamber includes 432 members chosen by popular suffrage, the membership being based on a ratio of one to every 69,181 inhabitants. Prussia is the most potent factor in the German Empire; its king is the emperor of Germany, and his chief ministers of state are the same as those chosen for the empire. The army and navy are an integral part of those of Germany, while its representation in the national bundesrath is numerically the largest. It has seventeen members in that body, and 236 deputies in the diet or reichstag. See **German Empire**.

PRUTH (prōōth), a tributary of the Danube River, which rises in Austria, on the northeastern side of the Carpathian Mountains. After a course of about 400 miles toward the southeast it joins the Danube at Galatz. It forms the boundary between Roumania and Russia, has a deep valley, and is navigable to Jassy.

PRUSSIC ACID (prŭs'ĭk), a colorless liquid discovered by Scheele in 1783, known scientifically as hydrocyanic acid or cyanide of hydrogen. It has a specific gravity of .7, boils at 80°, and solidifies at 5°, forming

feathery crystals. There are various sources of prussic acid, among them the kernel of the bitter almond, and the fruits of the peach and apricot families. It is derived also from the leaves of the cherry, laurel, and peach, and from different parts of various plants. A week solution of prussic acid is useful in treating bronchitis and affections of the mucous membrane, but when administered in excessive doses, it acts as a dangerous poison and death results almost instantly.

PSALMS (säms), **Book of,** a book of the Old Testament, containing the songs of praise used by the Jews in their worship in the temple. It contains 150 psalms or sacred lyrics, and was arranged by the Hebrews in five books, each having particular superscription and terminating with a doxology. It is evident that the book was brought together from many sources, and its composition and compilation extended over centuries. Some writers have assigned it almost entirely to David, but others think that Solomon wrote a number of the psalms. It is certain that some of them were not written until after the Babylonian captivity, and still others in the time of the Maccabees. About seventy allusions were made to the Psalms by Jesus and his apostles. It is mentioned by the apostles more frequently than any other book of the Old Testament. No serious doubt as to its canonical authority has ever been expressed, and the Christian Church has made it the recognized psalter.

PSEUDONYMS (sū'dŏ-nĭms), the fictitious names assumed by writers to conceal their identity. They are frequently called nom de plumes. The practice of publishing books and magazine articles under a false name originated with persons who wanted to induce people to believe them the works of those whose names they bore, and because the writers did not care to be spoken of in connection with their publications. Many young authors have become connected with pseudonymous names for the reason that they did not wish to risk revealing their identity, and later the assumed names clung to them and became more widely known than their real names. This is particularly true of such writers as Marian Evans and D. R. Locke, who are better known by their respective pseudonyms, George Eliot and Petroleum V. Nasby. The following is an abbreviated list of pseudonyms adopted by famous authors:

Adeler, Max	Charles Heber Clark.
Atlas	Edmond Yates.
Bab	W. S. Gilbert.
Bell, Currer	Charlotte Bronte.
Bell, Acton	Anne Bronte.
Bell, Ellis	Emily Jane Bronte.
Bickerstaff, Isaac	Dean Swift.
Biglow, Hosea	James Russell Lowell.
Billings, Josh.	Henry W. Shaw.
Boz	Charles Dickens.
Breitmann, Hans	Chas. G. Leland.
Bystander	Goldwin Smith.
Carmen Sylva	Queen of Roumania.
Crayon, Geoffrey	Washington Irving.
Elia	Charles Lamb.
Eliot, George	Marian Cross Evans
Graduate of Oxford	John Ruskin.
Greenwood, Grace	Mrs. S. J. Lippincott.
H. H	Helen Hunt Jackson.
Hamilton, Gail	Mary Abigail Dodge.
Harland, Marion	Mrs. M. V. Terhune.
Ian Maclaren	John Watson.
Jean Paul	J. P. F. Richter.
Kerr, Orpheus C	R. H. Newell.
Knickerbocker, Diedrich	Washington Irving.
Meredith, Owen	Earl of Lytton.
Miller, Joaquin	C. H. Miller.
Nasby, Petroleum V.	D. R. Locke.
Nye, Bill	Edgar Wilson Nye
Opium Eater	T. de Quincey.
Optic, Oliver	W. T. Adams.
Pindar, Peter	John Wolcott.
Quad, M	C. B. Lewis.
Rob Roy	John Macgregor.
Sand, George	Madame Dudevant.
Shirley	John Skelton.
Slick, Sam	T. C. Haliburton.
Titcomb, Timothy	J. G. Holland.
Titmarsh, Michael Angelo	W. M. Thackeray.
Twain, Mark	Samuel L. Clemens.
Uncle Remus	Joel Chandler Harris.
Ward, Artemus	Charles F. Browne.

PSYCHE (sī'kĕ), in Greek mythology, the youngest of three princesses, whose beauty excited the jealousy of Venus and so attracted those with whom she came in contact that she was often mistaken for Venus. After observing for some time the popularity of Psyche, Venus sent Cupid or Love to inspire her with admiration for the most contemptible objects. However, Cupid himself soon became enamored of her, and his passions were fully reciprocated by the maiden. The nightly visits of the two lovers attracted the attention of the two jealous sisters of Psyche, who prevailed upon her to fear that she was in courtship with a monster. Though it had been previously understood that the maiden should not inquire regarding the personal affairs of Cupid, she was so aroused to curiosity that on one occasion she carried a burning lamp to the chamber of her lover, in whom she discovered the handsomest of gods. In the excitement that followed Cupid was awakened from his sleep, only to reprove her for her doubts and vanished from her sight. Soon after Psyche and Venus became fully reconciled, and the two lovers were united in immortal wedlock with the sanction of Jupiter. Writers generally regard the story of Psyche as personifying the human soul in its progress through the afflictions of life until immortal peace is realized.

PSYCHOLOGY (sī-kŏl'ŏ-jў), the science of the human soul, treating the phenomena of its attributes and operations as manifested in connection with the body. The study of this branch of knowledge has been variously designated as mental science, mental philosophy, and metaphysics, though the last stated term in its scope often designates more than psychology, and at other times less. As a science it is to be classed with the inductive group, since its laws are discovered by observation, either through the agency of personal study or by the testimony of others. Though a knowledge of psychology is of

much value to all, especially to teachers and professional men, its study is either limited or neglected, largely because it demands close observation, careful reflection, and precision in making discrimination. Besides, there are many differences of opinion regarding divers matters of interest in relation to the nature and operation of the different faculties of the mind. However, the multiplication of text-books and greater interest in professional associations are fast extending study and broadening research.

Though man is known to be constituted of mind and matter, the nature of neither is definitely understood, and we may study them only by their acts or effects upon each other and upon external things. Both the mind and the body have certain powers, or ability to act and do. The powers relating to the body are known as physical, and those pertaining to the mind as psychical, both showing close dependence upon each other. All the powers of the mind are grouped in three classes, known respectively as intellect, sensibility, and will. The intellect comprises the powers by which we are able to know; the sensibility, those by which we feel, and the will is the power by which we choose and execute. This division of mental powers does not imply that the mind is composed of organs or parts. On the contrary, it is one indivisible thing. It is the mind as a whole that knows, feels, and wills. There is a close relation between the body and the mind, but the relationship is especially intimate between the mind and the nervous system, particularly the brain. It is not difficult to realize this relationship when we contemplate the effect that a severe physical pain, such as toothache or a wound, has upon the mind, or that mental exhaustion exercises on the bodily functions.

The intellect, being the power to know, cannot be cultivated without bringing the mind in contact with objective realities. An object that has no real existence cannot be known, though psychical objects are considered as real as the objects of material nature. Among the objects of knowledge are the acts and states of the mind; the product of mental acts, such as concepts and thoughts; and external material objects. Writers generally agree that we can be conscious only of our mental acts and states; that we know only what we can recall into consciousness, and that the degree of consciousness is increased by applying the mind vigorously to the acts or states perceived. The power of self-direction possessed by the mind is called the attention, which varies in degree from a slight energy to an intense concentration of the mind on one object to the exclusion of all others. Attention being under the control of the will, it can be cultivated by the exercise of will-power over the movements of the mind. An enlargement of ability to apply attention is followed by greater power of perception. The whole process of acquiring knowledge involves a succession and network of mental activities. These include sensation, discrimination, perception, analysis and synthesis, comparison, judgment, conception, and reasoning.

Sensation comprises the conscious state resulting from the action of some organ of sense under nervous stimuli, and is the first step in acquiring knowledge. Discrimination is the discernment of distinctions while the mind is undergoing sensations, thus leading to a perception, which may be defined as the power of acquiring immediate and fundamental knowledge. Analysis involves a separation of parts into their elements, while synthesis implies the combining of several constituents to form wholes. The term comparison implies the discernment of likeness and unlikeness between several objects, thus leading to the formation of a primary judgment, and ultimately to conception and reasoning. Though the acquirement of knowledge depends to a large extent upon the power to give attention, the latter is again dependent upon interest, which invites and sustains attention and thus bears directly upon successful study. Memory represents to the mind objects previously known, while imagination represents objects not as they are or were, but as they may be or might have been. Both are susceptible to training, and by right use constitute elements of vast importance in mental culture.

The powers of the intellect may be subdivided into four groups, namely, the presentative, representative, reflective, and intuitive. By the presentative powers we acquire knowledge of the outside world through the five senses—hearing, seeing, tasting, smelling, and feeling—and to these some writers add the sense of muscular resistance. The representative powers include memory and imagination, the former involving the two mental acts of reproduction and recognition. The reflective powers make it possible for us to establish the relations and connection of objects, while the intuitive powers enable us to know certain fundamental facts intuitively. There is a general agreement among writers that we acquire at least seven fundamental ideas by intuition. These include the idea of space, place, being, time, right, cause, and personal identity, each of these being as self-evident as the truth that a part is not equal to the whole, and that a person cannot be in two places at the same time.

Since all feelings are actions or states of the soul, they are classed as psychical. However, those arising in the bodily organism are generally termed corporeal to distinguish them from those originating exclusively in the mind. The corporeal feelings include sensations, appetites, and instincts. Sensations arise from some excitement of the nervous system, while appetites are occasioned by the wants of the body, and instincts attend sensations and appetites,

but are not governed by a directing intelligence. The psychical feelings proper are divided into emotions, affections, and desires. It may be said that all feelings are pleasurable or painful, and that they are induced and extended largely by education and early training.

The will, being the power of choice and execution, enables us to decide upon our conduct and to put forth the necessary volitions. Both choice and execution are necessary to constitute a completed act of the will. It is man's power to use deliberation in making a choice and to exert force in execution that he stands preëminent above all other creatures. Not what a man knows, or what his feelings may be, count as much in estimating character as the choice of conduct and the execution of his designs. Writers do not agree whether man possesses freedom of the will. Those holding that the will is not free generally agree that education, sensibilities, and environments operate to limit and modify, while those of the opposite school think that man has perfect freedom to choose and power to put forth volition. The responsibility resting upon those who presume to teach and direct in daily conduct should not be under-estimated. It should be their aim to stimulate the power of the will by wise activity, and to inculcate promptness in forming decisions. Only when the will is developed in harmony with the intellect and the sensibility can a definite and stable character result.

PTOLEMY (tŏl'e-mĭ), **Claudius Ptolemæus,** eminent Greek geographer and mathematician, flourished in Alexandria, Egypt, in the 2d century A. D. It is thought that he was born at Ptolemais, a Grecian city of the Thebaid, and that he published the result of a line of astronomical and geographical observations in 139 A. D. Some writers assign a number of discoveries to him as late as the year 161, though it is certain that his chief work, "Megale Syntaxis tes Astronomias," was published at an earlier date. This work is known among the Arabs as "Almagest," meaning the greatest, and includes some of the most valuable early discoveries in astronomy. The "Geographike Hyphegesis" is a noted geographical work in eight books, and besides it he published a catalogue of fixed stars and a number of treatises on astrological subjects. He maintained the Ptolemaic system of astronomy in his "Almagest," which was so named because he was its most eminent expounder. It assumes that the earth is a fixed body, remaining constantly at rest in the center of the universe, with the sun and moon revolving around it as attendant satellites. The more complicated movements of the planets were represented by a contrivance illustrating each planet as revolving in a great circle called a deferent, while within the great circles revolve the centers of small circles called epicycles, the latter immediately surrounding the planets, and each member of the system having its own deferent and epicycle. Since the ancients regarded movement imperfect except in a circle, this system was accepted till in the 16th century, when the modern or Copernican system, which regards the sun as the center of the planetary system, was announced and immediately superseded it.

PUBLIC SCHOOLS. See Schools.

PUCK, or **Robin Goodfellow,** the name applied in England to a fairy. It corresponds to the Knecht Ruprecht of Germany, the Nisse Goddreng of Scandinavia, and the Brownie of Scotland. Shakespeare employs Puck as a prominent figure in his "Mid-Summer Night's Dream," while writers generally regard the term applicable to all species of sportive fairies, capable of serving in domestic relations, but generally characterized by their jovial and merry pranks. They are represented in literature as of small stature, affectionate to the beautiful, mischievous to the housemaids, and easily induced by kindly gifts to serve in performing many household duties. A widely read illustrated weekly periodical published in New York City has adopted "Puck" as its name.

PUEBLA (pwĕb'lä), an important city of Mexico, capital of the state of Puebla, seventy-five miles southeast of the city of Mexico. It is located on a fertile plain about 7,000 feet above sea-level, has important railroad connections, and enjoys a large trade in agricultural produce and manufactures. The streets are regular and wide, intersecting each other at right angles, and there are many substantial buildings, among them the museum, theater, several colleges, and a splendid cathedral. Its manufactures have long been among the most important of Mexico. They include cotton and woolen goods, boots and shoes, glass, leather, soap, earthenware, and machinery. The city was founded in 1533 by the Spaniards. Santa Anna made an unsuccessful effort to capture it in 1845, and Maximilian took it by storm on May 17, 1863, after a siege of two months. Population, 80,465.

PUEBLO (pwĕb'lō), a city of Colorado, county seat of Pueblo county, on the Arkansas River, 115 miles south of Denver. It is the second city of the state, and one of the most prosperous between the Rocky Mountains and the Missouri River. A large number of important railroads center there, giving it excellent trade facilities and an outlet for its large mining and manufacturing interests. It has electric and gas lights, street railways, excellent public schools, numerous churches, and several well equipped libraries. Among its public institutions is the State Agricultural Society and the asylum for the insane. The manufactures embrace wire, furniture, lumber products, carriages and wagons, farming implements, mining machinery, hardware, and

earthenware. It is the seat of important railroad shops and smelting works. The surrounding country is noted for its valuable deposits of gold, silver, and other minerals. Population, 1900, 28,157.

PUEBLO INDIANS, the inhabitants found by the Spaniards in Mexico, New Mexico, and Arizona, when exploring that region in the 16th century. Their state of society was of a semi-civilized character at the time of the discovery of America. They lived in villages, and the tribe was divided into four groups, each speaking a different dialect. The men were about five feet tall, and the women were somewhat smaller in stature; their complexion was a fair olive. Their dwellings were largely in villages, and they engaged in agriculture, mining, and manufacture. The Pueblo villages were built in the form of rounded or oblong squares, and some of their habitations were large enough to contain a number of families, being several stories high, and in many cases from 200 to 500 feet long. These dwellings were made of sun-dried brick, with cross-beams and finishing of wood, and in them were apartments for different families of the tribe, each occupying an eating and living room, a store room, and a kitchen. To provide against attacks of enemies they made no doorways or entrances in the lower stories, but entered the dwellings by means of ladders from the roof or through upper apartments.

The Pueblos were skilled in weaving and spinning. They made excellent pottery, baskets, utensils, and building material, and were considerably advanced in cultivating the soil. Many of their villages may still be traced, and there are evidences of vast systems of irrigation in many parts of Arizona and New Mexico, indicating that they conducted the water by dams, ditches, and embankments for many miles to supply sufficient moisture for the germination and maturity of crops. Their clothing was made of cotton, fur, fibers derived from bark, and feathers. The weapons consisted of stone axes, lances, flint knives, bows, and javelins, and the warriors wore helmets and shields of the skins of animals. It is evident that they possessed considerable advancement in the use of medicines, had a system of instruction, and conducted spiritual worship. When the Spaniards conquered Mexico fully 30,000 Pueblos were resident in Mexico and the regions immediately north. It is evident that large numbers of these people resided in Texas, Utah, Colorado, and Nevada at different times, since many ruins of houses and villages have been discovered, some of them being now covered by sands. It is thought that they were prevented from spreading farther to the north by the hostile Indians occupying those regions, and that they were driven from their northern possessions in different periods. Some writers think that the cliff-dwellers were the ancestors of the Pueblos, since many ruins of cliff dwellings discovered in various cañons of Mexico, Arizona, and Colorado bear some marks of similarity to the dwellings constructed by the Pueblos.

Among the noted cliff-dwellings are those of the San Juan cañon, where remarkable habitations were occupied fully 1,000 feet above the Mancos River, while in other places clusters of dwellings were constructed upon terraces formed by the soft strata of limestone or sandstone wearing away. Some of these dwellings occupied a position between upper and lower terraces, the two forming a natural floor and roof, while the openings were faced with walls of sun-baked brick and coated with a natural cement to closely resemble natural cliff formations. At present there are about 10,000 Pueblos, who are direct descendants of those discovered by the Spaniards, and their modes of living and industries closely resemble those of their ancestors. Most of the Pueblo settlements are in the valley of the Rio Grande and those of its tributaries. Among the most important villages is Zuni, situated near the western boundary of New Mexico, and in the northeastern part of Arizona are the seven Moqui villages. Christian missionaries have induced some to embrace Christianity, but the greater number still hold to their ancient traditions, though their civilization and industries have been materially affected by the teachings of the whites.

PUERTO PRINCIPE (pwĕr'tō prēn'sē-pā), a city of Cuba, capital of the Puerto Principe province, and for many years the seat of the supreme court of justice of the Spanish West Indies. It is surrounded by a fertile region, and has railway connections with Nuevitas, its port on the northern shore of Cuba. Among the manufactures are cigars, clothing, earthenware, and utensils. It has a growing trade and good municipal improvements. Population, 1899, 25,102.

PUFENDORF (pū'fĕn-dôrf), **Samuel**, philosopher and clergyman, born in Chemnitz, Germany, Jan. 8, 1632; died Oct. 26, 1694. He first studied at Grimma, and later at Leipsic and Jena. Soon after completing his studies at the latter university, he became tutor to the son of the Swedish ambassador at Copenhagen. In 1661 he accepted the chair of Roman law at Heidelberg, where he attained remarkable success by his eloquence and careful devotion to the subject-matter of instruction. He accepted the professorship of law of nations at Lund, offered him by Charles XI. of Sweden, in 1670, and in 1677 became historian to the king of Sweden with the dignity of counselor of state, and took up his residence at Stockholm. In this capacity he published a history of Sweden from the expedition of Gustavus Adolphus into Germany to the death of Christina. The elector of Brandenburg invited him to Berlin in 1688, where he wrote the history of his life and reign, which was

published in nineteen volumes. It was his intention to resume historical writing in Sweden, but his death occurred at Berlin. Pufendorf execised remarkable industry in gathering material for his work, for which purpose he drew largely from archives, and the genius with which he labored portrayed the marks of great intellectual power. Among his publications are "History of Charles Gustavus;" "History of the Principal States of Europe;" "History of Sweden from the Expedition of Gustavus Adolphus into Germany to the Death of Queen Christina;" "Life and Reign of the Elector of Brandenburg, Frederick William," and "Spiritual Monarchy of the Pope." The king of Sweden made him a baron in 1694.

PUFF ADDER, a species of poisonous serpents native to Africa, but most abundant in the regions south of the equator. It is one of the most dangerous serpents of Africa. Its length is from four to five feet, and it is quite thick in proportion to its length. It is so named because when irritated puffs appear on the upper part of its body. The Bushmen poison their arrows with its venom.

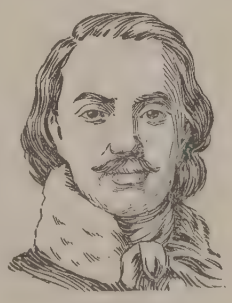
PUFFBALL, the name of any fungus of the genus lycopudon, so called from the shape and from its puffing out dark-colored dusty spores when the matured plant is broken open. Puffballs grow in roundish form from the ground or decaying wood, and when immature have a firm and fleshy interior, which later becomes a powdered mass. The spores are borne in cavities in the interior of the globular mass, and when the surrounding tissues become dried and ruptured, they escape in the form of fine dust. Some species grow without a stem, while others appear at the upper part of a fleshy prominence and often acquire a circumference of several feet. Many are edible, while their fumes are used in some countries instead of chloroform for anæsthetic purposes.

PUFFIN (pŭf'fĭn), a genus of diving birds of the auk family, native to the Arctic and northern temperate regions. The bill is deep and excessively compressed, with naked skin at the corners of the mouth, and the upper mandible extends to the top of the head, both mandibles being transversely grooved. The wings, tail, and legs are short, and, like the auks and penguins, they rest or sit in an upright position. Though able to fly rapidly, they cannot sustain long flights, but have much skill in swimming and diving. The puffins are migratory birds, and are seen in large flocks. They feed on fish, insects, and various forms of shell-life. The flesh and eggs are alike wholesome for food. Thousands of puffins may be seen in the North Atlantic and Pacific oceans, especially in Kamchatka and the Kurile Islands.

PUGET SOUND (pū'jĕt), an inlet from the Pacific Ocean, on the northwestern coast of Washington. It is the southern continuation of the Strait of Juan de Fuca and Admiralty Inlet, has a coast line 280 miles in length, and contains a number of important islands and bays. Ships of the largest size may sail safely in all parts of the sound, since its shores are high and deep water extends very near to the land. The surrounding country is fertile and richly timbered, while canal and railroad improvements have greatly enlarged its commercial importance. The principal cities on its shores are Olympia, Tacoma, and Seattle.

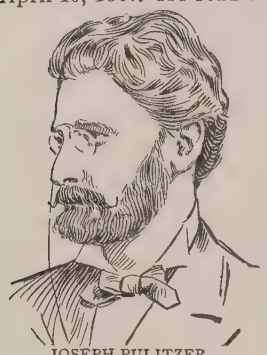
PUGH, James Lawrence, statesman, born in Burke county, Georgia, Dec. 12, 1820. He accompanied his parents to Alabama in infancy, where he received an academic education, and in 1841 was admitted to the bar. Soon after he became a member of the state senate, and in 1859 was elected to congress, but retired when Alabama seceded from the Union in 1861. He was elected to the Confederate congress in the same year, and was reëlected in 1863, but served as a private in the Confederate army. In 1875 he aided in framing the state constitution, and in 1880 became a member of the United States senate, to which he was reëlected in 1884 and in 1890. Pugh was a leading and influential member of congress and took part on many important committees and in several notable debates.

PULASKI (pū-lăs'kee), **Casimir**, Polish count and patriot, born in Podolia, Russia, March 4, 1748; died near Savannah, Georgia, Oct. 11, 1779. He was an active opponent of Russian oppression, and joined his father and brothers in opposing King Stanislaus Augustus. After the death of his father, he became leader of the insurgent forces, and in an attack on Warsaw attempted to capture the king, but, being defeated in battle, he was required to seek safety by fleeing to France. He met Benjamin Franklin while in Paris in 1775, and two years later joined the American army at Philadelphia against the British. Congress made him brigadier-general for distinguished services in a number of engagements, particularly at the battle of Brandywine. He entered Charleston with his command of infantry in May, 1778, and on Oct. 9, 1779, was mortally wounded at the siege of Savannah. He was taken on board the United States brig Wasp, on which he died two days later, and his body was buried at sea. A monument was erected to his memory by the citizens of Savannah.



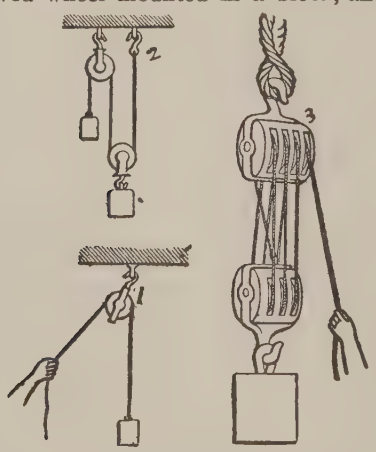
CASIMIR PULASKI.

PULITZER (pū'lĭt-sẽr), **Joseph**, American journalist, born in Budapest, Hungary, April 10, 1847. He studied in his native city, but came to America while yet a youth, and soon engaged as reporter on the "Westliche Post," St. Louis, a German periodical under editorial charge of Carl Schurz. His able and efficient service soon made him managing editor and later proprietor of the journal. He became a member of the Missouri legislature in 1869, supported Horace Greeley for the presidency, and in 1884 was elected to congress as a democrat. His journalistic work caused him to resign his seat, giving his entire attention to the publication of the "New York World," which he purchased in 1883. This periodical had only a limited circulation, but the untiring energy of Pulitzer placed it on a profitable and influential basis until it became one of the most remarkable journals of modern times. It now has a circulation of 575,000 daily, while the Sunday edition reaches 550,000 copies. Pulitzer founded the "St. Louis Post-Dispatch" in 1878.



JOSEPH PULITZER.

PULLEY, one of the six simple machines or mechanical powers. It consists of a grooved wheel mounted in a block, and is



PULLEYS.

used to increase power and transmit it, by means of a rope or flexible cord, in a changed direction. The ends of the axis of the wheel are supported by a framework called the block, and a groove cut in the edge of the wheel prevents the rope from slipping off when it is put around the pulley. Pulleys may be fixed or movable, as shown in the accompanying figures; the former are those in which the block containing the pulley is fixed, as in figure 1, while the block in the latter class is adjusted to move with the raising or lowering of the rope, as shown in figure 2. There is neither gain nor loss of power with a single fixed pulley; for, as the tension in every part of the rope is the same, if a weight be suspended at one end, an equal weight must be applied at the other end to maintain equilibrium. Hence, the effect of a fixed pulley is simply to give advantage in changing the direction of a force. However, by combining several pulleys in various ways, an instance of which is shown in figure 3, it is possible to gain purchase or mechanical advantage, this depending more or less upon the mode of combination and the number of pulleys utilized.

The advantage of a system of pulleys may be computed by comparing the velocity of the weight raised with that of the moving power; hence, it may be considered that a single movable pulley gives a mechanical advantage equal to two, or the weight may be said to be twice the power. A single fixed pulley is considered a lever of the first class; a single movable pulley is a lever of the second class; and in combinations the utility of both is more or less exemplified. In theory the advantages are increased as the movable pulleys are multiplied in combination, but advantages that would ordinarily result are to some extent overcome by the friction caused by imperfect flexibility of ropes. This is due also in part to the friction of the pulley sheave upon its axis, which is now quite largely overcome by making the framework of iron or steel and adjusting the axis so that ball-bearings may be utilized. The term pulley is variously applied in machinery, particularly to a wheel on which a band or belt runs for changing the direction of motion, or one in which power is transmitted to or from different parts of the machinery.

PULLMAN, George Mortimer, inventor, born in Chautauqua county, New York, March 3, 1831; died Oct. 19, 1897. After obtaining a general education, he engaged as a mover of houses, and in 1853 contracted to move warehouses along the Erie Canal, which was being widened at that time. He settled in Chicago in 1859, where he contracted to raise brick and stone business blocks without disturbing the business of the occupants. This work was done successfully by a system of jackscrews, and the buildings were thus brought to conformity with the graded streets. In 1863 he turned his entire attention to the building of sleeping-coaches, and in 1867 organized the Pullman Palace Car Company. The business increased with such rapidity that he founded the industrial town of Pullman in 1880. This town is situated fourteen miles south of the center of Chicago, near Lake Calumet, and covers an area of 500 acres. It is finely

platted, has modern municipal facilities, a circulating library, and is the seat of vast manufacturing enterprises. It is not only supplied with all the best sanitary conditions, but modern conveniences and the social and educational welfare has been kept in mind. In 1890 the town of Pullman was incorporated with the city of Chicago. Mr. Pullman designed the vestibule train, by which the separate coaches of an entire train are united by connections forming safe and convenient passage to all the cars. He was president of a company that constructed the metropolitan street-car system of New York City, and promoted many other enterprises. One of his sons, George M. Pullman, died at San Mateo, California, Nov. 28, 1901. He was born June 26, 1875.

PULQUE (pul'kā), a vinous beverage made in many sections of Spanish America, especially in Mexico, by fermenting the juice of various species of the agave. It is milky, resembling thin buttermilk, and has a sour taste and an ill smell to those not accustomed to its use. The maguey species of agave, also called American aloe, is used mainly, since it contains the greatest amount of sugar, and the pulque is made by fermentation.

PULSATILLA (pŭl-sȧ-tĭl'lȧ), or **Pasque Flower,** a genus of flowering plants native to Europe. The species are perennial, have bell-shaped flowers of a bluish color, and bear long, feathery awns on the fruit. The plants are narcotic and acrid. They yield a preparation known as pulsatilla, a medicine used in catarrhal inflammation, bronchitis, and other ailments. The flowers yield a bluish-purple coloring matter used quite largely in preparing Easter eggs.

PULSE, the beating of the arteries, due to the passage of the blood-waves caused by the successive contractions of the heart. It is noticeable, more or less, in many parts of the body in the state of poor health, but during health it is present only in the arteries, and may be felt by placing a finger lightly upon an artery running over a bone, as the radial at the wrist, or the temporal in front of the ear. The pulse varies at different ages and under different conditions. At birth the number of beats is about forty per minute, at the end of the first year 120, at the end of the second 110, during middle life between seventy and eighty, and in old age usually a little more. There are from five to eight beats less in males than in females, and the pulsations are more numerous during excitement or exertion, while they are noticeably diminished while reclining or sleeping. The force and rate of pulsations are taken as an indication of the condition of health, but they cannot be taken as reliable symptoms of a particular disease without considering other conditions. In some diseases, particularly those affecting the heart, it is not infrequent for the pulse to beat as low as twenty-five pulsations per minute, while in fevers and other ailments they sometimes reach 200. In diseases of the brain or organic affections of the heart it is quite common to notice much irregularity of the pulse, though it is natural to some persons to have irregular pulsations. An irregular pulse is due either to the motions of the artery being unequal in number and force, a few beats being from time to time more feeble than the rest; or to a pulsation being left out entirely, thus causing intermission of the pulse from time to time.

PULTOWA. See **Poltava.**

PUMA (pū'mȧ,) or **Cougar,** an American carnivorous mammal, ranging from Canada to Patagonia. It has a reddish-tawny color

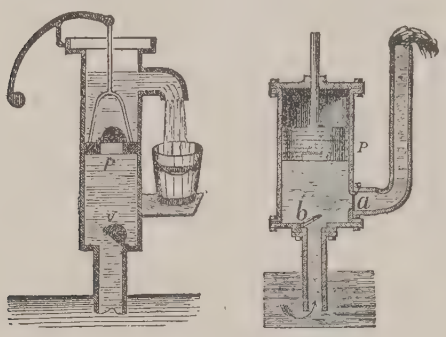
PUMA.

above and paler shades beneath. The adult is about three feet high and four feet long, measured from the nose to the tip of the tail. The puma is an expert climber, but is not confined to the timber districts. It is seen frequently among shrubs along the banks of rivers and on the open prairies and pampas. Its habits are much like those of the leopard, killing many more of the animals upon which it preys when convenient than it is able to devour, either for the sake of securing warm blood or gratifying an instinct to destroy. Pumas prey on cattle, sheep, swine, and other domestic or wild animals, but rarely attack man. When pursued they seek safety by ascending lofty trees. The name cougar was first applied by the French, while the Spaniards still call it leon, and hunters of the United States know it generally as panther. The puma may be domesticated with little difficulty.

PUMICE (pŭm'ĭs), a light mineral substance of volcanic origin, and formed from bubbles of steam or gas which accompany lava during a liquid state. It is highly porous, and may be said to be a spongy, froth-like lava. It is found principally in the vicinity of volcanoes, whence it was ejected, and its color is whitish or gray, though there are slate-blue and reddish tints. Its numerous pores render it so light that it floats readily on the surface of water, sinking only after being thoroughly saturated. Pumice is obtained largely from Iceland, the Lipari Islands, at Andernach on the Rhine, and various volcanic regions in

America. It is of value in polishing ivory, wood, leather, marble, bone, and metals.

PUMP, an apparatus for raising, exhausting, compressing, or circulating a fluid by drawing or pressing it through pipes or apertures. Many varieties of pumps have been invented, differing more or less in construction according to the purposes for which each is intended. The most important are the suction pump, the lifting pump, the force pump, and the centrifugal or rotary pump. The suction pump is the most common of these four classes, and is in general use for household purposes. It has a piston that works air-tight within a hollow cylinder or barrel, which is moved up and down by a handle connected to the piston rod, and has a valve (*P*) opening upward, as is shown in figure 1. Another valve (*v*) opening upward is at the bottom of the barrel, and, as the piston is raised, a vacuum is left below it in the pump barrel, into which the water of the well is forced by the pressure of the air. As the piston descends the valve at the bottom of the barrel closes and the valve in the piston opens, thus making a passage for the water above the piston. By successive movements of the piston the water reaches the mouth of the pump and escapes.



PUMPS.

Figure 1. Figure 2.

The suction pump and the force pump cannot exceed about thirty-five feet, since a column of water of that height exerts a pressure equal to that of the atmosphere, though in practice pumps seldom raise water higher than twenty-eight feet from the lower valve to the level of the wall. The lift pump is not limited in this way, since in that class of pumps the tube is placed a considerable depth into the well, and the piston is near the bottom of the pump tube. In the piston is a valve opening upward, thus allowing the water in the well to pass through it, and when the piston is drawn up its valve closes, while the valve near the mouth of the pump allows the water to pass through it, but when the piston descends it closes and does not permit the water to return. Thus, by a succession of movements, the water may be lifted from any depth, but the weight of the water makes it quite laborious to operate a lifting pump from great depths.

The force pump is used to force water into the higher stories of buildings, into standpipes or reservoirs of city waterworks, and to throw water over gardens or burning buildings. It has a solid piston that works air-tight in a tube or box (*P*) at the top of the pump barrel, and, as it is moved upward, the water rushes into a vacuum beneath it. When the piston or plunger moves downward, the lower valve (*b*) closes, while the valve (*a*) in the side pipe opens before the water that is forced outward by a pressure equal to the downward pressure of the piston. Force pumps are made also with double action, thus causing a continuous stream to flow from the mouth of the pump. The chain pump is used successfully where the supply of water near the surface is abundant. It consists of an endless chain passing over two fan-shaped wheels, one at the bottom of the well and the other at the surface. As the chain is put in motion by a crank, the cups passing upward through a pipe carry the water to the mouth of the pump. Centrifugal or rotary pumps are capable of lifting large quantities of water at short distances, and consist of a fan-shaped wheel that is rotated rapidly in a casing. The wheel is connected with the water by a pipe, and the rapid movement causes the water to flow by means of centrifugal action.

PUMPKIN (pŭmp'kĭn), a trailing plant of the gourd family native to India, but now naturalized and cultivated in practically all countries. The leaves are heart-shaped, the flowers large with yellow petals, and the vine often grows to a length of ten to twenty feet. Many varieties of pumpkin are grown, the fruit ranging in size from a few inches to two feet in diameter. The seeds are situated in rows within the fruit. They are

PUMPKIN.

small, white, and flat, and yield valuable medical properties useful in cases of tapeworm. Pumpkins are cultivated extensively in America for domestic food and as food for cattle. The fruit is yellow or reddish, and is used in making pies and butter, and is eaten when baked.

PUNCH, a tool for indenting or perforating sheets or plates of various materials, and for driving out or in an object inserted in a hole. It is usually made of steel, and its shape depends upon the uses for which it is intended. Punches for cutting steel pens, buttons, jewelry, and other similar articles are hollow and sharp-edged, while those for stamping dies, perforating, and driving objects into or out of metallic plates are solid. Punch is also the name of an alcoholic beverage made of wine and spirits. It is sweetened and flavored with orange or lemon, and commonly diluted with water. The "London Punch" is a weekly magazine devoted to comic, satirical, and humorous literature. It was founded in 1841 by Mark Lemon and Henry Mayhew, and is now as important in the publication of comic sketches in prose, verse, and caricature as is "Puck" in America or the "Kladderadatsch" in Germany.

PUNCH AND JUDY, or **Punchinello**, in Italian Pulcinella, a popular puppet show of Italian design. Its origin is ascribed to Silvio Fiorillo, a comedian who flourished about the middle of the 17th century. The principal figures are Punch and Judy, two cleverly contrived puppets worked by a person within a box, while a second person stands on the outside to keep up the dialogue, which is carried on with the person inside, though it is represented that the figures do the talking. Punch and Judy represent various scenes in domestic and public life, though generally a man and his scolding wife, the latter being carried off by a policeman or demon as the closing scene.

PUNCTUATION (pŭnk-tū-ā′shŭn), the art of dividing written discourse into sections by means of points for the purpose of marking the grammatical connection and dependence, and making the sense more obvious to the eye. In ancient writing words run together successively without break or pause, though in the later specimens points are used for oratorical purposes. Aristophanes, the Greek grammarian of Alexandria, invented a system of punctuation, but this was forgotten to such an extent that Charlemagne employed several scholars to restore it. Aldus Manutius, a printer of Venice, Italy, in the latter part of the 15th century invented the main features of the modern system of punctuation. As there is no arbitrary punctuation, it is necessary to exercise good judgment and taste for the purpose of avoiding defects, ambiguity, or confusion in the construction of a sentence. A sentence unpointed and unspaced in the manner of the ancients is difficult to read, and at first sight appears to be written in an unknown tongue. The following is an example of the two methods, one written solid, and the other properly spaced and punctuated: Readingmakethafullmanconferenceareadymanwritinganexactman. Reading maketh a full man; conference, a ready man; writing, an exact man.

The chief use of punctuation is to divide discourse into sentences, and these again into parts, in a manner so as to show the relation of various parts to each other. It is based largely on grammatical analysis, requiring accurate discrimination. A change in the punctuation of a sentence generally produces a change in the meaning. This is nicely illustrated by an incident connected with the proceedings of the English house of commons, where a member was required to publicly apologize for calling another a liar. This he did, while standing in the presence of the body, in these words: "I said he was a liar, it is true; and I am sorry for it." The apology was generally accepted as satisfactory, but a London newspaper gave it a different meaning by publishing it in this manner: "I said he was a liar; it is true, and I am sorry for it." Another example of the necessity of care in punctuation is the following:

John Keys, the lawyer, says he is guilty.
John, Keys the lawyer says he is guilty.
John Keys, the lawyer says he is guilty.
"John Keys the lawyer," says he, "is guilty."

The principal European languages employ six chief points in punctuation. These include the period (.), placed after every declarative or imperative sentence and after every abbreviated word; the comma (,), employed to denote the least degree of separation, and for separating the members of a compound sentence and dependent clauses; the semicolon (;), used to separate parts of sentences less closely connected than those separated by commas; the colon (:), employed to separate parts of sentences less closely connected than those separated by the semicolon; the interrogation point (?), used to show that a question is asked; and the exclamation point (!), used to indicate some emotion. Other marks generally used include the dash (—), employed to indicate an omission, a sudden pause, a sudden or abrupt change in the construction of a sentence, and sometimes to add effect to other marks; the parenthesis ( ), used to enclose words that break the unity of the sentence; the brackets [ ], employed to enclose some word or words necessary to explain or correct an error; the quotation marks (" "), used to enclose quotations from the language of another person; and the apostrophe (’), employed to indicate the omission of a letter. The section (§) denotes the small divisions of a book or chapter; the ellipsis (****) indicates the omission of words, and the caret (∧) is used to show that something has been omitted. Various marks are employed

to refer to marginal notes, such as the asterisk (*), the dagger (†), the double dagger (‡), the section (§), the paragraph (¶), and the parallel (‖). The index (☞) is used to designate some important statement or sentence, and dots (. . . . .) indicate that words have been omitted from a quotation.

PUNJAB (pŭn-jäb), or **Panjab**, the most northern province of India, so called because the region is drained by the five tributaries of the Indus—the Ravi, Beas, Sutlej, Chenab, and Jhelum rivers, the word Punjab meaning five rivers. The province is somewhat larger than the Punjab proper. It lies immediately east of Afghanistan and Beluchistan, south of Cashmire, west of the northwest provinces, and north of Rajputana and Sind. It has a total area of 110,675 square miles, and a population of 21,500,000. Ranges of the Himalayas traverse the northern part, but in the southern portion the surface is either level or undulating and consists of a great alluvial plain. Extensive deposits of rock salt and alum-beds abound, and there is an abundance of limestone for building purposes. The principal products are tobacco, wheat, barley, opium, rice, cotton, sugar cane, maize, indigo, tea, and flax. Valuable forests are abundant, but there is a scarcity of rainfall in some sections, making it necessary to irrigate from wells and reservoirs in a portion of the region. Lahore, the capital, is situated in the center of the province. Other cities are Delhi and Amritsar. Manufacturing enterprises are successfully carried on in the cities. It has extensive interests in rearing live-stock, including camels, cattle, sheep, and goats. The people are mostly Mohammedans.

PURITANS (pū'rĭ-tans), the name first applied in England, in 1564, to a class of Protestant members of the Church of England who desired to purge more completely Roman Catholic ceremonies from the practice of the church. The liturgy and discipline arranged by Archbishop Parker still retained certain features of the Roman Church, which the Puritans wished to eradicate without destroying the existing establishment. They differed from the Separatists or Independents in that the latter preferred to abandon the established church, and were represented by the Pilgrim Fathers. Later the Puritans became either Presbyterians or Independents, both in England and the new settlements of America, and their spirit was one of severe moral earnestness, united with a Calvinistic theology. The spirit of Puritanism exercised a marked influence on the policy of England in the reign of James I and Charles I., both making vigorous efforts to exterminate it, but its power grew even more important when Laud and Charles sought to abridge the national liberties of the people. Cromwell was the recognized representative of the Puritans, and his triumph was made possible by the devoted efforts of Puritans in the parliament and in the army. Many Puritans emigrated to America after the return of episcopacy with the restoration of 1660 and the act of uniformity of 1662. They are the founders of the New England states. The opposition to amusements grew into a spirit of persecution, but it began to relax at the beginning of the 18th century. Puritanism was the most rigid in New Haven and Massachusetts, and exercised a molding influence in Connecticut, Rhode Island, New Jersey, Maryland, and South Carolina.

PUSEY (pū'zĭ), **Edward Bouverie**, noted clergyman, born at Pusey, England, in 1800; died Sept. 16, 1882. He was the son of Philip Bouverie, younger brother of the first earl of Radnor, who assumed the name of Pusey, and in 1822 graduated from Oxford. Soon after he became fellow of Oriel and was appointed professor of Hebrew at Oxford in 1828, a position he held till his death, and to which a canonry at Christ Church was attached. He visited Germany with the view of studying religious movements, and published his first work, entitled "State of Religion in Germany." In 1835 he joined Newman and Keble in publishing "Tracts for the Times." The vice-chancellor of Oxford suspended him in 1843 from the ministry for three years on account of preaching a sermon inculcating the high sacramental doctrine on the Holy Eucharist. When Newman went over to Catholicism, Pusey preferred to remain in the Anglican Church, and continued to defend evangelical doctrines with great force by lectures and pen. For more than half a century he ranked as one of the chief members of the Church of England, and in private life as well as in public affairs he practiced the most devout spirit of sincerity and gentleness. His influence extended to the support of churches and societies, while he aided liberally by gifts to the poor. Among the many works from his pen are "Lectures on the Prophet Daniel;" "Defense of Church Principles;" "Private Confession in the English Church;" "Letters to the Archbishop of Canterbury;" "Benefits of Cathedral Institutions;" "On Holy Baptism;" "Councils of the Church," and "Catalogue of Arabic Works in the Bodleian Library."

PUTNAM (pŭt'nam), a city of Windham county, Connecticut, on the Quinebaug River, twenty-five miles south of Worcester, Mass. It has good railroad facilities, excellent schools, modern municipal improvements, and contains many fine business blocks and residences. Putnam has a large trade in lumber and lumber products. Among the manufactures are cotton textiles, woolen and silk goods, boots and shoes, cutlery, machinery, steam-heaters, carriages, and trunks. Population, 1900, 6,667.

PUTNAM, George Palmer, publisher, born in Brunswick, Maine, Feb. 21, 1814;

died in New York City, Dec. 10, 1872. In 1828 he became a clerk in a book store, and in 1840 entered the establishment as partner, conducting a branch house at London for seven years. He returned to New York City in 1848, where he published "Putnam's Magazine" with the assistance of George William Curtis, which was merged into "Scribner's Monthly" in 1870. From 1863 to 1866 he served as collector of internal revenue in New York, but he again entered the publishing business. Putnam aided in founding the Metropolitan Museum of Art, and served on an important committee at the Vienna University Exposition. His published works include "Tourist in Europe;" "Index to Universal History," and "Biography and Useful Knowledge."

PUTNAM, Israel, patriot and soldier, born in the part of Salem, Mass., now called Danvers, Jan. 7, 1718; died May 19, 1790. He settled in Windham county, Connecticut, in 1738, where he devoted himself to fruit culture and wool-growing. He entered the military service as captain at the beginning of the French and Indian War, serving in the battle of Lake George. For gallantry as a leader of a band of rangers he was made major in 1757, and the following year was captured by the Indians, who attempted to burn him alive, but his life was saved by Captain Molang, a French officer. He was exchanged in 1759, and three years later accompanied an expedition to the West Indies, taking part in the capture of Havana. At the beginning of the Revolutionary War he became brigadier, and for bravery at Bunker Hill was made major-general by congress. Putnam commanded at Boston, New York, and Philadelphia, and in 1777 was appointed to defend the highlands of New York. When Clinton captured the forts, Putnam was relieved of his command, and spent the following two years in raising recruits for the American army. In 1779 he made a visit to his home, where he was stricken by paralysis, and was obliged to give up active military life. Putnam was one of the chief "Sons of Liberty," and was a leading figure in the stirring times that characterized the early part of the Revolution

PUTNAM, Rufus, soldier, born in Sutton Mass., April 9, 1738; died in Marietta, Ohio, May 1, 1824. He was a cousin of Israel Putnam, studied mathematics and surveying, and in 1773 was engaged as a deputy surveyor in Florida. At the beginning of the Revolutionary War he became chief engineer with the rank of colonel, and in 1778 aided Israel Putnam in fortifying West Point. He was made brigadier-general in 1783, served in the Massachusetts legislature, and in 1787 aided Governor Lincoln in suppressing the Shay Rebellion. In 1788 he assisted in founding Marietta, Ohio. He was appointed judge of the supreme court of the Northwest Territory in 1789 and United States surveyor-general in 1793, serving till 1803.

PUTREFACTION (pū-trē-făk'shŭn), the decomposition of animal or vegetable matter, accompanied by fetid odors. It is now regarded as a kind of fermentation due to the growth of minute plants called bacteria, which enter the putrescible bodies—that is, those decomposing at a certain temperature in contact with air and moisture—and in them grow and multiply. Great numbers of spores of bacteria and kindred organisms are present in the air and water, and grow and multiply most rapidly by the free contact of humid air at a temperature ranging from 60° to 30°. Putrefying animal matters give off more unpleasant gases than vegetable matters for the reason that nitrogen is more abundant in the former. Organic bodies of a higher order are changed in the process of putrefaction into lower organic compounds, but also into such inorganic compounds as ammonia and sulphuretted hydrogen, and into such substances as nitrogen and hydrogen. Putrefaction may be arrested or prevented under various conditions, among them that of keeping the substance perfectly dry, by the use of antiseptics, by keeping the substance in a temperature a few degrees above zero, by keeping it in a vacuum, or in a vessel containing air deprived of all organic germs, and by heating to the boiling point and then sealing to keep out all atmospheric air.

PYGMALION (pĭg-mā'lĭ-ŏn), in Greek legends, the king of Cyprus and grandson of Agenor. After making an ivory statue of a young maiden, he fell in love with it, and at his entreaty Venus endowed it with life. Later the maiden became his wife, and is noted as the mother of Paphus.

PYGMIES (pĭg'mĭz), the persons of very small size, or the tribes of people much smaller in stature than the average of mankind. The most notable races of pigmies include the Akka, Batwa, and Obongo tribes of Central Africa. Other similar tribes include the Andamanese and Kalangs in Malaysia. These peoples have a usual height of about four and one half feet, and lead chiefly a pastoral life. Pygmies are spoken of in the fables and legends of Greece, and Homer mentions the attacks of cranes upon them on the coast of Oceanus. Many of the stories regarding pygmies have been regarded fabulous, though they are mentioned by Aristotle as existing near the sources of the Nile. This fact was verified by the German explorer, Schweinfurth, while traveling in Central Africa in 1868-71. See **Dwarfs.**

PYM (pĭm), **John,** statesman, born near Bridgewater, England, in 1584; died Dec. 8, 1643. He descended from a good family, and after elementary study entered Oxford University in 1599, which he left before graduating to study law at an inn of the Court. In 1621 he was elected to parliament

as a representative of the popular party, and there became distinguished as an opponent of monopolies and absolutism favored by the court of James I. He opposed the duke of Buckingham, a favorite of Charles I., in the famous impeachment trial, and in 1640 became a leader of the long parliament, after that body had been in abeyance for thirteen years. At the beginning of the session Pym delivered an elaborate address, in which he summarized the grievances of the nation and boldly denounced the earl of Strafford as an oppressor and tyrant. In the impeachment trial of Buckingham, which followed soon after, he took a leading part, and succeeded in having a bill of attainder passed upon him. Open hostilities soon followed, which led to the defeat of Charles I. and his execution. Pym had been appointed as lieutenant of ordnance in 1643, but died about a month later. The remains were buried at Westminster Abbey, but, when Charles II. was restored, they were removed to St. Margaret's Cemetery.

PYRAMID (pĭr'ȧ-mĭd), an architectural structure of solid masonry, built for various purposes in different parts of the world.

PYRAMIDS OF EGYPT.

The most remarkable pyramids are those of Egypt, situated in a group at Gizeh, near Cairo. This group begins at a point nearly opposite Cairo, on the border of the Libyan Desert, and extends southward about twenty-five miles. They consist of colossal masonry, rising from a rectangular base, and terminating in a point so as to form four triangular sides. The principal material used in their construction is a durable limestone quarried from the hills near by, though there are great slabs and blocks of granite placed on the outside to increase durability, which were evidently taken from quarries at great distances from the location of the pyramids. It is supposed that these structures date from a period between 3000 B.C. and 2300 B.C., and that they were designed mainly as sepulchral chambers of the kings. The most remarkable group consists of nine pyramids about four miles southwest of Cairo, where stood the ancient city of Memphis.

The Great Pyramid belongs to this group, and was reared above the tomb of Cheops, the second king of the fourth dynasty. It was originally 481 feet high, 756 feet square at the base, and is counted one of the Seven Wonders of the world. Some of the stones are of remarkable size, and it has long been a subject for speculation as to how the ancients were able to provide mechanical power sufficient to quarry, transport, and elevate them to their proper places. Herodotus, the Greek historian, estimated that it required 100,000 men for a period of ten years to construct a causeway for the transportation of the stone from the quarries for this single pyramid, and that the labor of the same number of men was required for twenty years to complete the structure. The apex of this pyramid was once quite sharp, but now a flat about three yards square exists at the upper part. It has suffered from removal of a part of the material to construct mosques and temples at Cairo, but still covers thirteen acres and is 451 feet high. A series of steps averaging about three feet in height are at the outer surface, though these were originally hidden by a coating. In the interior are several chambers ornamented with red granite. They may be entered only through an opening on the north side, about fifty feet above the base. Some writers think that this pyramid was built as an astronomical observatory, since the ratio of its height to the perimeter of its base is as nearly as possible that of the diameter of the circle to its circumference, and there are other structural peculiarities in support of this view.

The Gizeh pyramid of second importance is one built by Chafra, third king of the fourth dynasty. It covers about ten acres, has a base 700 feet square, and a height of 448 feet. In this pyramid are two sepulchral chambers that were opened in 1816, and though once encased and ornamented with polished stones, only a portion of the casing remains. The third pyramid of this group was built by Menkaura, fourth king of the fourth dynasty, and is 354 feet square at the base and 212 feet high. It is the best constructed of the three greater pyramids, and still shows the best evidence of former beauty. The other six pyramids of the Gizeh group are smaller and of less interest. Another noted pyramid is about five miles northwest of Gizeh, at the village of Abou Roash. Several groups are in Nubia, probably built by the kings of ancient Ethiopia. Pyramids of considerable importance are situated in various parts of Assyria, China, India, Greece, and Italy.

The pyramids of Mexico have come down from the time of the Aztecs, and rise as four-sided structures. The most important group still existing is at Teotihuacan, twenty miles northeast of the city of Mexico. It includes several hundred structures, but only two of importance. The largest has a base 900 feet square, with a height of 160 feet, while the second is 130 feet high. The most noted of Mexico is that of Cholula, having a length of 1,585 feet, and a height of 178 feet.

The Mexican pyramids are inferior to those of Egypt, and less remarkable and durable in structure, but all are uniform in facing the cardinal points.

PYRAMUS AND THISBE, the two lovers mentioned in the fourth book of Ovid's "Metamorphoses," whose tragical history is introduced as an interlude in Shakespeare's "A Mid-Summer Night's Dream." The story of these two lovers is that they were tenderly devoted to each other, but parental consent was not given to their marriage, so they met secretly and conversed through an opening of the wall in their adjoining houses. It was agreed at one time that they should meet at the tomb of Ninus, and Thisbe was the first to reach the place of meeting, but a lioness caused her to flee for safety. She dropped her robe in the flight, which the lioness at once seized and covered with blood from an ox it had torn to pieces the same day. When Pyramus appeared he discovered the blood-stained robe and concluded that Thisbe had been killed, and, despairing, immediately ended his life. Shortly after Thisbe returned to the trysting place, and when she discovered the dead body of her lover lying upon the ground, she also killed herself.

PYRENEES (pĭr'ę-nēz), the lofty mountain range which separates France from Spain, and extends from the Atlantic to the Mediterranean. The mountain range consists of two parellel chains, about twenty miles apart. Its length from the Bay of Biscay to the Gulf of Lyons is 275 miles, and its width is from twenty-five to seventy-five miles. Toward the center, nearly midway between the Atlantic and the Mediterranean, are the highest peaks, Mount Maladetta, 11,424 feet, being the culminating point. Only a few passes suitable for wagoning occur in the Pyrenees, but in 1885 two railway lines were authorized by France and Spain to penetrate the mountains, partly at the expense of each government. These railways are located near the extreme ends of the chains, and are in successful operation. The Pyrenees slope most abruptly toward the south, but there are fine springs and health resorts in both countries, and the climate is delightful.

PYRITES (pī-rī'tēz), the name of any one of the native metallic sulphides that occur in rocks of all ages. Formerly the name was applied only to sulphuret of iron, but now the term has a general application, and the various groups are designated as iron pyrites, copper pyrites, cobalt pyrites, etc. The pyrites consist of metals compounded with sulphur or arsenic, or with both. The color is yellowish and the consistency crystalline and hard. Sulphuric acid is derived from iron pyrites; cobalt, from cobalt pyrites; and copper, from copper pyrites. Nickel pyrites has a copper-red color, and yields nickel and arsenic.

PYROTECHNY (pī-rō-tĕk'nў), the art of making and using fireworks. It is of great antiquity, and was practiced among the Chinese with much skill before the art became known in other countries. While the Romans used candles, small rockets, and other similar articles, the Chinese developed a system of most brilliant mechanical arrangements, among them movable figures and devices, including those from which the figures of men and animals dart to surprise the company. Many of the forms and devices used in Europe at present are of Chinese manufacture or patterned after their productions. The manufacture of fireworks has grown to considerable importance in the United States, but notable importations are still made from China and Japan. See **Fireworks**.

PYRRHUS (pĭr'us), king of Epirus, born about 318 B. C.; slain at Argos in 272 B. C. He was a distant relative of Alexander the Great, and was placed on the throne when only twelve years of age, but after five years the crown was transferred to Neoptolemus, his great-uncle. Pyrrhus soon joined the army and distinguished himself in the battle against Antigonus, at Ipsus, in 301 B. C., and thereby recovered his dominion and shared it with his rival. In 295 B. C. he deposed his rival and became sole king of Epirus. After adding parts of Macedonia to his dominion the following year, he joined the Greeks in an invasion of Italy against the Romans, and in 280 B. C. won the celebrated battle on the Siris River, in which he terrorized his opponents by leading a charge with a large number of elephants. This victory cost him many of his best men, and after a second battle he concluded a truce and retired to Tarentum, where he wintered. In 279 B. C. he attacked the Romans in Apulia, and the next year invaded Sicily to expel the Carthaginians, but after several brilliant successes he was repulsed by the latter with great loss. In 275 B. C. he made another invasion of Italy, but was defeated near Beneventum by an army under the consul Curius Dentatus, and escaped to Tarentum with only a few of his men. His next enterprise was to invade Macedonia, where he secured a success so complete that the Macedonian troops joined him in a body, and his delight in warfare immediately caused him to invade the Peloponnesus against the Spartans. His attempt to take Sparta was unsuccessful, and he next proceeded against Argos, where he was killed.

PYTHAGORAS (pĭ-thag'o-ras), Greek philosopher, founder of the Italic School of Philosophy, born on the Island of Samos about 582 B. C.; died at Metapontum about 500 B. C. He was the son of a successful merchant, and spent thirty years in gathering knowledge from the most noted philosophers of Syria, Phœnicia, Babylon, India, Egypt, and other countries. Some writers regard him a disciple of Thales and Anaximander, while it is certain that he studied

the philosophy of these and other illustrious Greeks, and that he left Samos about 529 B. C. and established his school in Crotona, Italy. Though his school advanced many ideas in radical distinction from those generally accepted, large numbers of disciples were attracted there by his recognized ability and superior character. His institution resembled a religious brotherhood for moral reformation of society rather than a philosophical school, and his teachings were rather those of a moral reformer than a scientific instructor, though he gave his attention to political and scientific problems. While in Egypt he learned the doctrine of the transmigration of souls from the priests, of which he became a devoted advocate, and asserted his belief that he had previously lived and passed through other stages of existence. On one occasion, when hearing the howl of a dog, he asserted that he recognized in the sound the voice of a departed friend.

The school of Pythagoras was represented by 300 members, who were bound by vow to cultivate the rites of their master and to both study and disseminate his philosophy. Its influence was exerted in favor of the aristocratic party, which influenced the democratic party to oppose him in such a manner that he was required to retire to Metapontum. Pythagoras was one of the greatest of early philosophers. He was the first to assume the title of philosopher, meaning lover of wisdom, instead of sophos, meaning a wise man. He based all creation upon the numerical rules of harmony, and asserted that the heavenly spheres roll in musical rhythm. His ideas of astronomy were the most advanced of those of the early philosophers, for he taught that the sun is the center of the universe, and that the earth and planets move around it in the heavens, a view not generally accepted until 2,000 years after his death. He was commanding and dignified in appearance, taught by discourses in public assemblages, and limited himself to vegetable food. His teaching before the students was largely scientific and philosophical, while in public he discoursed almost exclusively regarding the relations of mankind from the standpoint of ethics and morals. Since he regarded nature in uniformity with the will of God, he held that human life should make an approach to the harmony of nature. His followers regarded him as half divine and placed unquestioning faith in his teaching.

PYTHIAN GAMES (pĭth'ĭ-ăn), one of the four great national festivals of Greece, celebrated every fifth year in honor of Apollo, at Delphi. It is said that they were instituted by Apollo after he had overcome the dragon Python, and until 586 B. C. they took place every eighth year, but at that time they came under the direction of the Amphictyons, who instituted their celebration every fifth year. They consisted of athletic sports, flute playing, and chariot and horse racing. Later contests in sculpture, painting, tragedy, and historical recitations were added. Prizes of gold and silver were awarded in the early history of the games, but afterward the laurel wreath and palm branch were substituted. These games were in importance next to the Olympic games, and continued to be played until about 394 A. D.

PYTHON (pī'thŏn), a genus of snakes native to the tropical regions of Africa and Asia, and closely allied to the boa. They differ from the boa mainly in having double plates under the tail, teeth in the intermaxillary bone, and pits in the shields around the margins of the upper and lower jaws. Pythons attain a length of from fifteen to thirty feet, and crush their prey in their coils. The tail is prehensile, with which they suspend themselves from the branches of trees near places where animals come to drink, and take them unawares by casting their coils about the neck and body. They are capable of strangling deer, tigers, buffaloes, and other animals. The two most important species are the rock snake of the East Indies and the Natal rock snake of Africa, and there are allied but smaller species in Australia and the Malay peninsula. The female python lays its eggs in a nest near a body or stream of water, and hatches them by the heat of the body.

Q, the thirteenth consonant and seventeenth letter of the English alphabet. It has only one sound, that of k or hard c, and is always followed by u. It is used mostly as an initial letter of a word, and never as the final letter. Since its office could be filled by kw or k, it is superfluous in English. The Anglo-Saxons did not use it, its sound being expressed by cw or cu, but later borrowed it from the Latin-French. It is so named from the French word queue, meaning tail, its form being an O with a tail attached.

QUACKENBOS (kwăk'ĕn-bŏs), George Payn, educator, born in New York City, Sept. 4, 1826; died in New London, New Hampshire, July 24, 1881. He graduated from Columbia College in 1843, entered upon the study of law, but became principal of a collegiate school in New York City. In 1848-50 he was editor of the "Literary Magazine," and edited several treatises and dictionaries of foreign languages. Though a successful educator, he is best known by a large number of school text-books written by him and published under his direction. Among them are "Advanced Course of Rhetoric and Composition;" "Natural Philosophy;" "School History of the United States;" "Language Lessons," and series of text-books of arithmetic and English grammar.

QUADRANT (kwŏd'*r*ant), in astronomy, an instrument for measuring altitudes, so named because of its being graduated on a scale of 90°, the quarter of a circle. It consists of a graduated arc of 90°, with a movable radius for measuring angles on it, and has been largely superseded by the mural circle and the meridian circle. However, it is still used to some extent on shipboard to measure the altitude of the sun, but there it is giving place to the sextant, an instrument quite similar in principle and application. The quadrant is giving way to the other instruments named because it is less adapted than they to secure reasonable exactness of the whole arc.

QUADRILATERAL (kwŏd-rĭ-lăt'ĕr-*al*), in military science, a combination of four fortresses, so located that each may effectually support the others in case of an attack. Fortresses located in this manner make it necessary that an enemy employ a large army to attack successfully the combined position. The most remarkable quadrilateral is situated in the northern part of Italy, and includes the four fortresses of Legnago, Mantua, Peschiera, and Verona. These form a powerful barrier in the northern plain of the Po River, and were important in the wars between Austria and Italy, and also when that section was invaded by Napoleon III. in 1859. The Polish quadrilateral is a similar combination of four defensive forts maintained by Russia in Poland.

QUADRUPLE ALLIANCE (kwŏd'ru-p'l), the name applied to several alliances formed by various European states with a view of counteracting political tendencies or promoting compliance with recognized treaties. The triple alliance contracted by Austria, France, and England in 1718 was converted into a quadruple alliance the following year by Holland joining the contracting parties. It was occasioned by Spain seizing Sardinia in 1717, and Sicily in 1718, contrary to the terms of the Peace of Utrecht, and also because Alberoni, the ambitious minister of the Spanish king, planned to acquire the throne of France for Spain and to influence the accession of the house of Hanover in England. Spain was compelled to abandon all these designs after a prolonged conflict of arms. The quadruple alliance formed by Prussia, Austria, Russia, and England in 1814 was occasioned by the ambition of Napoleon I., and led to the dissolution of the French Empire.

QUÆSTOR (kwĕs'tor), the title of certain magistrates of ancient Rome, whose offices were established in the early period of the Roman kingdom. The duties pertaining to the office included management of the public treasury, the receipt of tribute and taxes, and the payment of moneys on account of public service. Patricians were at first the only persons eligible to the office, but in 421 B. C. the number was increased from two to four, and the plebeians became eligible to service. With the annexation of acquired territory the duties of the quæstors were multiplied, and the number was increased accordingly. At the beginning of the First Punic War eight quæstors were provided for, and these were increased to twenty by Sulla, and to forty by Julius Cæsar.

QUAGGA (kwăg'gȧ), an animal of the horse genus, native to South Africa, but now extinct or assimilated with the zebra. This class of animals differed from the zebra in being stronger and heavier, and having no stripes on the limbs, though the head and neck closely resembled those of the zebra. The color was a dark reddish-brown on the upper parts, with white bands on the head and neck, and a black line running along the spine. They had no warts on the hind legs; the mane was short and upright, and at the shoulders they were about four feet high. The lower parts of the body were white, but

there were bars of a brown or black tinge at the upper parts of the legs. They were so named from the voice, which somewhat resembled the bark of a dog. They did not

QUAGGA.

generally associate with the zebra, but, since they were gregarious in habits, the remaining numbers joined the herds of zebras. Formerly many quaggas roamed on the plains of South Africa. They became extinct on account of their skins being valuable in the manufacture of boots and shoes, for which they were hunted by the Boers and other European settlers.

QUAIL, a class of birds of the partridge family, differing from other partridges mainly in being smaller and having longer wings and a shorter tail. They are capable of enduring flight more successfully than the grouse. The average length of the body is about seven inches, though the numerous species differ somewhat, from the larger varieties of Eurasia to the small quails, about four inches in length, found in China. Twelve American species have been described, the best known being the common quail of the United States, which is sometimes called bob-white. The latter name is applied because of its call-note. It is mainly reddish-brown in color, with mottled

COMMON QUAIL.

markings of a darker hue, and is about ten inches long. Its claws are acute and slightly curved. The common quail of Europe is migratory, but those of the United States do not migrate. Quails feed on grain, seeds, and insects. The young brood is guarded carefully by the mother, though in habit quails are somewhat quarrelsome among themselves. The female builds a nest in the ground, where from eight to fifteen eggs are laid. They never perch in trees, but rest on the ground at night, and seek shelter in the winter by gathering in packs under shrubs, grasses, and vines. The flesh is considered a great delicacy on account of its fine flavor and tender qualities. In many states quails are protected from extermination by statutory law.

QUAKERS, or **Society of Friends**, a Protestant sect founded in England by George Fox in 1648. The founder was a man of zealous devotion and pure life, and after preaching for some years in churches and public places, gathered about him a large number of preachers, who assisted in promulgating his doctrines. Many persecutions were perpetrated upon him and his devoted followers, and some were even transported to penal colonies by the authorities, but through persevering efforts the doctrines secured a strong foothold in Britain and America. At first no particular organization and discipline were adhered to, but such scholarly and learned men as William Penn and Robert Barclay not only stimulated organization, but took an important part in their colonization in the new world, especially in Pennsylvania and New Jersey. The Quakers have not been particularly numerous, either in Europe or America, but their purity of life and firm and uncompromising position on various important questions have given them a wholesome influence in public affairs.

Among the doctrinal tenets of the Quakers is the view that the spirit of God is revealed immediately to each soul, a doctrine founded chiefly on passages in the first chapter of the gospel of St. John, where the Word is spoken of as the life and light of man, and as "the true Light, which lighteth every man that cometh into the world." Thus, it is held that this light comes both to the heathen and the Christian, and manifests the love and grace of God toward all mankind. They deny the necessity of the practice of the sacraments of baptism and the Lord's supper; maintain no stated ministry, holding that the form of worship in which a person waits in silence and patience upon God is best; and practice remarkable simplicity in their dress, speech, household furniture, marriages, and funerals. Much stress is laid upon earnestness and honesty, holding their members duty bound to pay their debts in full, even after having been released from legal payment by bankruptcy or the statutes of limitation. In the main they agree with other sects in the doctrines of Christianity, holding the Scripture as proceeding from the spirit of God, and believing in the Father, Son, and Holy Spirit. They accept the atonement of Christ, and believe in sanctifi-

cation by the spirit. The Quakers have been consistent in supporting every form of temperance, and in opposing slavery and war.

At present there are four principal divisions of Quakers, known as Orthodox, Hicksite, Wilburite, and Primitive Friends. The Orthodox Friends represent the original organization, and are the most numerous. At present they have 840 churches, 1,290 ministers, and 95,000 church members, distributed more or less over the United States, but numerically strongest in Indiana, Iowa, Kansas, and Ohio. The Hicksite Friends comprise a division organized in 1827 by Elias Hicks, who held that all the Scriptures are not inspired, and denied the spiritual conception and divinity of Christ. Fully one-half of the American Quakers followed his leadership, and at present the division includes 115 ministers, 210 churches, and a membership of 22,850. The Wilburite Friends are followers of John Wilbur of Rhode Island, who, in 1843, dissented from the Orthodox Friends on the ground that their position inclined too much toward the evangelical. They maintain fifty-three churches and forty ministers, and have 4,500 members. The Primitive Friends claim to adhere most closely to the primitive customs of the society. They have ten churches and twelve ministers, and their membership is about 250. The latest reports show that the Quakers of the United States maintain eight institutions of learning, with ninety-five professors, 850 students, and endowment funds amounting to $1,500,000. Their principal educational institutions are Haverford College, near Philadelphia; Swarthmore College, near Philadelphia; Bryn Mawr College; and smaller institutions at Wilmington, Ohio; Richmond, Indiana; Oskaloosa, Iowa, and Newberg, Oregon. They have effective missions in China, Japan, India, Syria, Madagascar, and the West Indies. Their periodicals include "The Christian Worker;" "Friends' Intelligencer," and "Friends' Review." Quakers are disposed to be in favor of peace and good-will, maintain a simple body government, and have four classes of meetings, known respectively as preparative, monthly, quarterly, and yearly. In these all matters of discipline and government are discussed. The ministry depends largely upon individuals being moved by the spirit.

QUARANTINE (qwŏr'*a*n-tēn), an enforced isolation of any place or person infected with a contagious disease. The term originally implied isolation for a period of forty days. Quarantine regulations were first established in Venice about 1448. For many years it was customary in the leading ports of the world to inspect vessels coming from foreign or adjacent ports and to make an examination of their sanitary conditions. Ships found infected with epidemic diseases were required to forbear all intercourse with the port at which it arrived for forty days, but now the length of time varies according to the circumstances of the case, and is dependent upon the time in which all danger of infection passes away. A yellow flag is displayed from the head-mast of a vessel under quarantine, while at night a white light is displayed similarly. National quarantine stations were established by the United States in 1888, and an act of congress makes violations of their regulations punishable by fine or imprisonment, or both. Protection against contagious diseases in cities, towns, and minor divisions is vested under the laws of the different states in the local boards of health, which have power to establish quarantines in their respective districts.

QUARTERMASTER (kwar-tēr-măs'tēr), in military usage, an officer of a regiment or other body of troops, usually ranking as first lieutenant, in whom is vested the duty of assigning quarters, arranging camps, providing and issuing clothing and provisions, and furnishing storage and transportation. The quartermaster in the navy is a petty officer who assists the navigator and attends to the steering of the vessel, the compasses, signals, signal apparatus, lights, and other matters under the direction of a master.

QUARTET (kwar-tĕt'), a musical composition for four voices or four instruments, written on the obligato plan; that is, each part is necessary to maintain the effect of the whole composition. The ordinary instrumental quartet is arranged for the first and second violin, a viola, and a violoncello. There are three recognized quartets of singers, which are called respectively the mixed, male, and female quartets. The mixed quartet consists of the soprano, alto, tenor, and bass; the male is made up of the first and second tenor and first and second bass; and the female comprises the first and second soprano and the first and second alto. Haydn originated the quartet. Many compositions classed as quartets were later written by Mozart and Beethoven. Other great masters adding to this line of music are Schubert, Mendelssohn, Schumann, Spohr, and Brahms.

QUARTZ, a native oxide of silicon, which occurs either in a massive or crystalline state, and varies greatly in luster, transparency, and color. It is diffused abundantly throughout nature in both states. In the massive state it is not pure silex, containing various foreign substances, but in the crystalline state it is pure, and is formed of six-sided prisms, terminated by a pyramid at each end. Among the most abundant colors are gray, white or milk, purple, reddish, green, blue, and brownish. It abounds in rocks, and is an essential element of granite. Quartz is infusible in the blow-pipe flame, and resists all acids except hydrofluoric. It is positively electrified by friction, scratches glass readily, and two pieces may be rendered luminous by rubbing

together in the dark. Particular names are applied to the principal varieties of quartz, such as common quartz, rose quartz, smoky quartz, milky quartz, rock crystal, yellow quartz, blue quartz, fat quartz, amethyst, hornstone, flint, floatstone, carnelian, Lydian stone, radiating quartz, chalcedony, sapphire quartz, and agate. Quartz enters largely into the manufactures and arts, being employed for making cups, chandeliers, optical instruments, different grades of glass, and seals. It is important in the manufacture of pottery and porcelain of different kinds, for which purpose it is made into a powder. Quartz veins occur in metamorphic rock, and contain more metals than the masses of rocks through which they are distributed. Gold is found principally in quartz veins or in alluvial sands and gravel, but the quantities taken from alluvial deposits are mere fragments carried by weather and climatic conditions from their natural deposits in quartz veins.

QUASSIA (qwŏsh'ĭ-à), the name of a small tree native to the West Indies and tropical America, and so named from Quassi, a Negro who recommended the

QUASSIA: Flower and Plant.

bitter bark as a remedy for fever. The bark of the quassia was introduced as a medicine into Europe about the middle of the 18th century, and is now used extensively as a tonic in cases of gastric debility, and as a substitute for hops in making beer. When taken in excessive doses, it produces narcotic and irritant effects and sometimes causes vomiting. Its wood is useful in cabinet making, since it is free from attacks by insects. The quassia bark and products sold in the market are obtained chiefly from Venezuela, Panama, northern Brazil, and Guiana.

QUAY, Matthew Stanley, statesman, born in Dillsburg, Penn., Sept. 30, 1833. He graduated from Jefferson College in 1850, became a member of the bar in 1854, and entered the United States army at the beginning of the war, attaining the rank of colonel. In 1865-67 he served as a member of the Pennsylvania legislature. He was secretary of state in 1873-78 and recorder of Philadelphia in 1878-79. He became state treasurer in 1885, and was elected to the United States senate in 1887, serving in that capacity with considerable distinction for many years. In 1899 he was brought to trial on the charge of having used state funds for personal profit, but the jury rendered a verdict of not guilty. The legislature was unable to fill the vacancy in the United States senatorship and adjourned, but Governor Stone immediately appointed him to that position. In 1901 he was again elected senator by the legislature. Quay was long an influential factor in the republican party and attended many of its national conventions in an official capacity. He died May 28, 1904.

M. S. QUAY.

QUEBEC (kwē-bĕk'), an important city of Canada, capital of the province of Quebec, at the junction of the St. Charles and St. Lawrence rivers. It is about 300 miles from the Gulf of St. Lawrence, 150 miles northeast of Montreal, and is connected by numerous railway and steamship lines. The site of the city is partly on a steep promontory on the north side of the St. Lawrence, and partly in the St. Lawrence valley. The former portion contains a citadel and strong fortifications, while the latter is the chief seat of trade and has extensive business blocks. Among the most noted buildings of Quebec is the Laval University, founded in 1663. It is equipped with courses in law, theology, medicine, and arts, and has a museum and a library of 90,000 volumes. Other educational institutions of note include the Ursuline Convent, Morrin College, and Laval Normal School. It has many academies, high schools, and public and private schools. The city is the seat of numerous churches, charitable and scientific societies, hospitals, asylums, and a public library. The municipal facilities include electric and gas lights, street railways, pavements, waterworks, and public parks.

Quebec has a safe harbor, and there are wharves on both rivers for the accommodation of the largest vessels. The suburbs of St. John, St. Louis, and St. Roch's are situated west of the city, and southwest of St. John are the Plains of Abraham. The last named locality is famous as a battle ground in 1759, when General Wolfe lost his life at the point of victory. This event is commemorated in a column forty feet high. A monument sixty-five feet high is dedicated to the two commanders, Wolfe and Montcalm, and is situated in the upper part of the city. Among the manufactures are cutlery, leather, india-rubber goods, tobacco products, paper, nails, beet-root sugar, cordage, machinery, engines, and ships. The city has a large trade in lumber and is an impor-

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Bloodstone, polished (India.)
Tiger Eye, polished (South Africa.)

QUARTZ (obscurely crystalline.)

Chrysoprase, polished (Arizona.)
Agate and Carnelian, polished (Lake Superior.)

Jasper (Germany.)
Ribbon Jasper, polished (Siberia.)

tant shipping port. It was founded by Champlain in 1608, while exploring that region for France. The English took possession of Quebec in 1629, but restored it to the French in 1632. In 1759 General Wolfe gained his famous victory on the Plains of Abraham, and since that time the city has been a part of the British Empire. The inhabitants of Quebec are mostly French, and most of the periodicals of the city are published in that language. Population, 1901, 68,840.

QUEBEC, a province of the Dominion of Canada, whose boundary on the north is formed by Ungava and Labrador, on the east and south by the Gulf of St. Lawrence, New Brunswick, and the states of Maine, New Hampshire, Vermont, and New York, and on the west by Ontario. It has a total area of 347,350 square miles. Its surface is greatly diversified, and in many regions the natural aspects are varied and grand. The Notre Dame or Shickshock Mountains extend along the south side of the St. Lawrence from the vicinity of Quebec to the Gulf of St. Lawrence, and comprise the predominating system; their general elevation is about 1,500 feet, with peaks rising 4,000 feet above sea-level. The Laurentian Mountains, or Laurentides, stretch from Labrador to the Ottawa River, on the north side of the St. Lawrence, and form elevations ranging from 1,250 to 4,000 feet. The St. Lawrence River is the most important stream. Within the province of Quebec it receives the Ottawa, St. Maurice, Saguenay, and Bastard rivers. In the eastern part is the Northwest River, and in the northern part are the East, Ruperts, and Harricanaw rivers. Lakes are abundant, among them St. John, Peretibbe, Mistassini, Kakabonga, and Mattawa. There is a variable climate, the temperature ranging from 30° below zero in winter to 90° above in summer, and the rainfall is abundant for all classes of crops.

Quebec is particularly rich in valuable forests, a large part of the surface being still covered with primeval growth. Among the notable varieties are beech, white and red pine, ash, maple, hickory, walnut, cedar, oak, birch, elm, basswood, cherry, and spruce. The mines yield large quantities of iron, copper, salt, and phosphates, and there is a considerable output of gold, silver, asbestos, copper, plumbago, and apatite. The fisheries are important, since the province has a coast line of about 825 miles, and includes many lakes and streams that yield valuable fresh-water varieties. Among the principal catches are cod, lobsters, herring, and fry. The chief soil products include wheat, barley, oats, sugar-beets, hay, flax, tobacco, small fruits, potatoes, and garden vegetables. It has extensive interests in rearing cattle, horses, swine, and sheep. Among the manufactures are lumber products, furniture, chemicals, boots and shoes, tobacco products, steam and agricultural machinery, cotton and woolen goods, dairy products, and sailing vessels. The foreign commercial relations are principally with the United States and Great Britain, and embrace a growing trade in lumber, live-stock, coal, and fish. At present the railways include 3,750 miles, and there are telephone and telegraph lines in all the settled portions. Navigation is facilitated by 125 light stations, 160 lighthouses, and numerous fog alarms and light-ships.

The government of Quebec is administered under a lieutenant-governor, who is assisted by an executive council of nine members. The governor and council are responsible to the legislative assembly. This assembly consists of a legislative council of twenty-four members, and a lower department of seventy-four members; the latter are elected for four years by popular suffrage. The province is represented in the dominion parliament by twenty-four senators and sixty-five representatives. A public school system is maintained by general taxation, and includes elementary and high schools. Ample provisions have been made for the care of incorrigibles and unfortunates, and a large number of academies, colleges, and universties are supported. Among the principal institutions of higher learning are McGill University, Montreal; Laval University, Quebec; and Bishop's College, Lenoxville. Roman Catholic is the predominating religion, but religious worship is alike free to all, and there are flourishing Protestant institutions in the cities and many of the rural districts. Quebec is the capital and most historic city of the province. Other important cities are Montreal, Hull, Levis, Montmagny, Three Rivers, Sherbrooke, St. Henri de Montreal, St. Hyacinthe, and Ste. Cunegoude. The inhabitants are mostly of French descent. It ranks second in population among the provinces of Canada, being exceeded in the number of inhabitants only by Ontario. Population, 1901, 1,648,898. This number includes about 11,500 Indians.

QUEEN, the wife of a king, or the female sovereign of a kingdom. In some monarchies women are excluded from the throne by the Salic law, but in England the succession devolves upon the eldest daughter or female heir apparent, if a deceased sovereign has left no male heir apparent. A queen-consort is the wife of a reigning king; a queen-dowager is the widow of a deceased king; and a queen-regent, or queen-regnant, is a sovereign princess who has succeeded to sovereign power and holds the crown in her own right.

QUEEN CHARLOTTE ISLANDS, an island group in the Pacific Ocean, off the coast of British Columbia, situated north of Vancouver Island. The group includes a large number of islands, but only two are of material importance. These are Graham Island and Moresby Island, which stretch from northwest to southeast a distance of

160 miles, and are separated by a narrow channel called Skidegate Inlet. The former has an area of 3,000 square miles, and the area of the latter is placed at 1,500 square miles. Graham Island has a width of seventy miles at the northern extremity, and thence the land mass gradually narrows toward the southeast. The climate is moist but healthful, and there is a considerable growth of magnificent forest in all the group. An abundance of minerals occurs in the islands, including iron, copper, anthracite coal, and gold-bearing quartz. By far the largest part of the inhabitants are Indians, who engage in hunting and fishing. The islands belong to the province of British Columbia.

QUEEN CHARLOTTE SOUND, a channel of the Pacific Ocean, which separates the northern part of Vancouver Island from the mainland. It contains many islands, and numerous coast indentations extend from it toward the north and east. Edible fish, especially salmon, are abundant.

QUEENSLAND, the northeastern province of Australia, whose area is given at 668,252 square miles. It is bounded on the north by the Gulf of Carpentaria and the Pacific, east by the Pacific, south by New South Wales, and west by South Australia. The seaboard includes 2,250 miles, being greatly enlarged by the extension of the York Peninsula toward the north. A great mountain range extends from New South Wales, and runs parallel to the coast at a distance of from seventy to one hundred miles from the sea. The highest peaks range from 3,000 to 6,000 feet above sea-level. The coast regions are generally fertile and have an abundance of timber, but the interior and western parts are generally dry and barren. Chains of islands extend along the coast, and there are many inlets. East of the mainland is the Great Barrier Reef, extending parallel to the coast at some distance in the Pacific.

The drainage of Queensland is chiefly toward the southwest by the Murray system into the Indian Ocean, and by streams flowing into the salt lakes of South Australia, though the coast region is drained quite generally into the Pacific and the Gulf of Carpentaria. Among the principal rivers are the Warrego, Cooper, and Herbert, flowing toward the southwest; the Brisbane, Burnett, Fitzroy, Pioneer, and Burdekin, flowing into the Pacific; and the Mitchell, Gilbert, Flinders, and Gregory, flowing into the Gulf of Carpentaria. More than one-half of Queensland lies within the torrid zone, and the interior not affected by sea breezes has an extremely hot and dry climate. The temperature at Brisbane ranges from 30° to 106°, with an average of 70°. It has a rainfall of thirty-five inches, but many regions of the interior are extremely dry.

The forests yield pine, cedar, rosewood, tamarind, myrtle, and many other valuable species. Forests of gigantic eucalyptic trees abound. Wherever moisture is abundant there is a luxuriant growth, since frosts are exceedingly rare, thus rendering the region green all the year round, except in parts where vegetation is affected by the dry season. The mountains yield an abundance of copper, tin, lead, and gold. Considerable quantities of antimony, coal, plumbago, cinnabar, manganese, and salt are produced. The culture of the silkworm and the mulberry tree has been introduced successfully. Stock-raising and agriculture are the principal occupations. The domestic animals consist chiefly of sheep, cattle, horses, and swine; and the cereals embrace wheat, barley, oats, rye, and maize. It has a growing production of all kinds of tropical fruits, vegetables, and beet-roots. Various manufactured articles are produced, including clothing, machinery, utensils, and lumber products. The province has 3,500 miles of railways, and a large mileage of telegraph and telephone lines. It has an important coasting trade and considerable exports and imports. The chief imports are grains, flour, chemicals, oils, spirits, and manufactures; while the exports embrace timber, live-stock, minerals, wool, tortoise shells, and pearls. The pearl fisheries along the coast are important, and there are considerable interests in catches of shell-fish and deep-sea fish.

Queensland was first settled in 1825 near the present city of Brisbane, and it continued to be a penal station for the transportation of English convicts till 1839. The country was opened to settlers in 1842, when it was organized as a part of New South Wales, but in 1859 a separate colonial organization was formed. It is now an important member of the Australian federation, and its government is under a lieutenant-governor, who is assisted by an executive council. The legislative authority is vested in a parliament of two houses, the legislative council and the legislative assembly. The former consists of forty life members, and the latter of seventy-two members who are elected for four years by popular suffrage. A free public school system is maintained by local taxation and public grants, and is under the direction of a minister of education. School attendance is compulsory. All the leading church denominations have organizations, and a large majority of the people are Protestants. Several colleges and schools of higher learning are maintained in the leading cities, including both denominational and public institutions. Brisbane is the capital and largest city. Other cities include Ipswich, Maryborough, Townsville, Gympie, and Toowomba. The province has a population of 516,750.

QUEENSTOWN, a seaport city of Ireland, on the south coast of Great Island, nine miles southeast of Cork. It is nicely located on an eminence rising from the har-

bor of Cork, and its streets present a picturesque appearance as they rise above each other. There are strong fortifications on Spike Island and at the entrance of its well-sheltered harbor. The city has a fine Roman Catholic cathedral and several benevolent and educational institutions, and is an important station for emigration. It has no manufactures of importance and but little trade, since the mail business is transacted chiefly at Cork. The delightful climate and beautiful scenery attract many visitors to Queenstown. Formerly its name was Cove of Cork, but in 1849 it was given its present name. Population, 9,840.

QUERETARO (kā-rā′tä-rō), an important city of Mexico, capital of a state of the same name, 110 miles northwest of the city of Mexico. It is situated on a plateau 6,370 feet above sea-level, has good railroad facilities, and is surrounded by a fertile region. The city has extensive manufactories that produce cotton and woolen goods. These enterprises employ about 4,500 persons. Among the other manufactures are leather, machinery, clothing, tobacco and cigars, earthenware, and utensils. The city is well built, and its streets intersect each other at right angles. It derives its water supply from an aqueduct about ten miles long, which is supported a part of the distance upon arches ninety feet high. Among the principal buildings are several fine churches, a number of educational institutions, and the government buildings. Emperor Maximilian was besieged at Queretaro by the republican forces, and was shot there on June 19, 1867, by order of a court-martial. Population, 37,680.

QUERN (kwĕrn,) a hand-mill for grinding grain, used before the invention of water or wind-mills. It consisted of two circular stones, the upper of which was pierced in the center with a narrow funnel, and the lower was slightly dished. A wooden or metal pin was inserted in the lower stone, on which revolved the upper when turned by means of a stick thrust into a notch in the edge. The grain was dropped with one hand into the central opening as the upper stone was turned with the other. Devices for grinding grain in this manner are of great antiquity, as is evidenced by remains of querns dug up wherever regions were populated by Asiatic or European people. In some sections of Ireland, in the Shetlands, and in the Hebrides querns are still used to a limited extent. Specimens of querns now in the museums of Rome and other European cities give evidence that they were employed very extensively in the Roman period. Those dating from that time contain ornamentations of various Roman devices.

QUESADA (kā-sä′dä), **Ximenes de.** See **Ximenes de Quesada.**

QUEZALTENANGO (kā-säl-tā-nän′gō), a city of Guatemala, Central America, capital of a province of the same name, sixty-five miles northwest of Guatemala. It is situated on an elevated tableland, and has a fine cathedral and several government buildings. Among its manufactures are cotton and woolen goods. Alvarado founded the city in 1524. Population, 24,375.

QUICKSANDS (kwĭk′sănds), the masses of loose and moving sand found at the mouths of rivers and on many sea-coasts. They are formed on flat shores over beds of stiff clay through which water cannot penetrate, thus constituting a loose mixture of sand and water. Quicksands occur also in the vicinity of curves in narrow channels. In the latter case sand is carried by strong tidal currents to a favorable locality, where it is kept in a loose condition by moving water. Though not commonly of great extent, quicksands are dangerous to vessels or to persons, since they form an obstruction to passage and are so permeated with water that they are incapable of supporting the weight of a person. Quicksand is a term applied frequently to strata of loose sand, which in many regions carry excellent water veins.

QUILLOTA (kĕl-yō′tä), a city of Chile, twenty-three miles northeast of Valparaiso, on the Aconcagua River. It is one of the oldest cities of Chile and has excellent railroad facilities. The surrounding country is rich in minerals, especially copper. It has a number of educational buildings, several churches, and a considerable trade. The city suffered severely from earthquakes in 1822 and 1851. Population, 49,340.

QUIN, James, noted actor, born in London, England, Feb. 24, 1693; died in Bath, Jan. 21, 1766. He was of Irish descent, and made his first appearance on the stage at Dublin in 1714, but soon after engaged at the London Drury Lane theater. His eminence rests largely on his ability as a tragic actor, but he was also efficient in characters of a comic and sarcastic nature. In 1717 he engaged at Lincoln's Inn Fields, where he played the part of principal actor for seventeen years, and in 1734 returned to Drury Lane theater. Quin remained the most eminent actor in Britain until the appearance of Garrick, in 1741, and ten years later withdrew from the stage to his permanent residence at Bath. Among the plays in which he took a prominent part are "Tamerlane;" "Beggar's Opera," and as Falstaff in the "Merry Wives of Windsor." It is thought that he has never been excelled in the role of Falstaff.

QUINCE, a tree of the apple family. It is native to the western part of Asia, but has been naturalized in many regions and is cultivated extensively for its fruit. The tree seldom exceeds a height of twenty feet. It has oval leaves, irregular branches, and bears white or pale-red flowers. The fruit grows singly on young branches, and has a yellow or orange color. When plucked from the tree, it is hard and too austere to be

eaten, but is one of the most excellent products when boiled in sugar or made into preserves or jelly. A kind of preserve made from quinces is called marmalade. They are used in making a beverage similar to

QUINCE: Flower and Fruit.

cider. The seeds are demulcent and mucilaginous, and are used to some extent in medicine. The Japan quince is a small tree about six feet high, and is cultivated chiefly for its early and large, profuse flowers. The Greeks and Romans cultivated the quince extensively, and it is now grown in many sections of America and Europe.

QUINCY (kwĭn'zĭ), the third city of Illinois, county seat of Adams county, on the Mississippi River, 260 miles southwest of Chicago. It is at the junction of a number of important railway lines, has a fine site on bluffs overlooking the river, and enjoys a large commercial and manufacturing trade. Its streets are substantially paved and lighted by gas and electricity. A street railway system penetrates all parts of the city, and there are several suburban branches. Among its public improvements are excellent parks, a number of libraries, the county courthouse, and a United States government building. It is the seat of the State Soldiers' and Sailors' Home. Chaddock College, a Methodist institution founded in 1853, and parochial schools offer educational advantages. It has several hospitals and a fine system of public schools. Among the manufactures are carriages and wagons, paper, furniture, musical instruments, tobacco products, packed meat, engines, hardware, and machinery. The city has an excellent Episcopal cathedral and about fifty churches. It was platted in 1822, and was incorporated as a city in 1839. Population, 1900, 36,252.

QUINCY, a seaport of Massachusetts, in Norfolk county, seven miles southeast of Boston. It is conveniently connected with other trade centers by railways, and is noted for its extensive granite quarries, which were connected in 1826 with the first steam railway built in the United States. The city has manufactures of earthenware, boots and shoes, utensils, cigars, quarry products, and clothing. It is the seat of Adams Academy, a public library, and a home for infirm sailors, and has numerous schools and churches. Quincy was the birthplace of John Hancock, John Adams, and John Quincy Adams, and the tomb of the two Presidents Adams is beneath the portico of the Adams Temple, a church erected in 1828. The first settlement in the vicinity of Quincy was made in 1625, and the town was a part of Braintree till 1792. Population, 1900, 23,899.

QUINCY, Josiah, eminent lawyer, born in Boston, Mass., Feb. 23, 1744; died April 20, 1775. He graduated from Harvard University in 1763, took a law course, and attained to high rank as a lawyer. He denounced the stamp act and other oppressive measures imposed by parliament upon the colonists in a series of articles in the "Boston Gazette," signed Hyperion. In 1770 he and John Adams defended Captain Prescott and the British soldiers implicated in the Boston massacre, on March 5, 1770, though neither of these eminent men was in accord with the policy of the government. He published an able work in 1774, entitled "Observation on the Boston Port Bill," and in the same year went to England as a confidential agent of the colonial patriots, and was active in strengthening the American cause. His death occurred while on the return journey to America, off Gloucester, Mass. Quincy was eminent because of his ability as a lawyer and gift of oratory. His health was delicate from early youth.

QUINCY, Josiah, author and statesman, son of the former, born in Boston, Mass., Feb. 4, 1772; died there July 1, 1864. He graduated from Harvard University in 1790, took a law course, and became identified as a leading member of the federal party. After serving in the Massachusetts legislature, he was elected to congress in 1804, where he was distinguished as an orator and opponent of the policy of Jefferson and Madison. Among his most noted speeches are those against slavery, and in opposition to the embargo act and the Louisiana Purchase. He declared the latter as sufficient cause for the dissolution of the Union. He remained a member of congress until 1813, when he declined a reëlection because of the overwhelming success of the democratic party and the War of 1812, and devoted his attention principally to agriculture. However, he entered the senate of Massachusetts a few years later, was mayor of Boston from 1823 to 1828, and served as president of Har-

vard University from 1829 to 1845. While officiating in that capacity he introduced marking regulations, and acquired the great telescope. Among his principal writings are "History of Harvard University;" "History of the Town and City of Boston;" "Essays on the Soiling of Cattle," and "Life of John Quincy Adams."

QUININE (kwī'nīn), the most important alkaloid obtained from true cinchona bark, and first discovered in 1811. It is extracted from the bark with diluted sulphuric acid, and to precipitate the alkaloid a quantity of lime is added to the solution. The deposit is then collected and dried, and afterward it is exhausted with boiling alcohol, which dissolves the alkaloids. When the filtered alcohol solution is evaporated, the quinine is neutralized with sulphuric acid and the solution is concentrated until the sulphate crystallizes. Quinine is very bitter. It is almost insoluble in water, but is soluble in about its own weight of alcohol, and in twenty-two times its weight of ether. Its salts are used extensively in medicine on account of their tonic and antipyretic qualities, especially in malarial affections of all kinds. Its extraordinary value has given rise to a considerable trade in Peruvian bark, and the cinchona tree is now cultivated in many parts of America and Eurasia.

CINCHONA.
Fruit and Flower.

QUINOA (kwī-nō'ȧ), an annual herb native to the tropical parts of America, and closely allied to and resembling the common pig-weed. It attains a height of from four to six feet, and yields a white seed of value as food. The plant is cultivated in Chile, Mexico, and other countries, where its seed is ground and used in making cakes, porridge, and other articles of food. The red quinoa is a closely allied species, and yields red seeds containing medical properties used in treating bruises and sores. The quinoa plant has been naturalized in Europe, where the leaves are used as a substitute for spinach and the seeds serve as food for poultry.

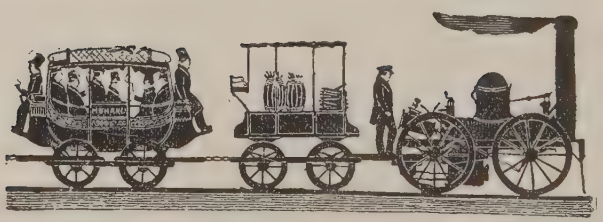
QUINTILIAN (kwĭn-tĭl'ĭ-ạn), **Marcius Fabius Quintilianus**, Roman advocate and rhetorician, born at Calaguris, Spain, in 36 A. D.; died about 118 A. D. He was the son of a teacher of rhetoric, studied at Rome under Domitius Afer, and became noted as a Roman advocate. From the year 61 to 68 he resided in Spain, but in the latter year he accompanied Galba, the future emperor, to the Roman capital. For nearly twenty years after the accession of Galba he was noted as a teacher of rhetoric and oratory, and among his students were such eminent men as Pliny the Younger and the two grand-nephews of Domitian. Emperor Domitian conferred upon him the consular dignity, and he attained to distinction as a pleader in the courts. He retired to private life about the year 89 to devote his attention to his great work, entitled "De Institutione Oratoria," a treatise on rhetoric in twelve volumes. It was written in a period of two years, and besides containing an elaborate treatise on rhetoric, it includes valuable criticisms and opinions of Greek and Roman writers.

QUIPU (kē'pōō), an aboriginal device for recording and conveying information, and formerly used in various parts of Asia, Africa, and America. It consisted of a series of colored and knotted strings tied at one end to a thicker cord, and the order, color, and knots of the strings were used like elements of a written language. The earliest instrument of this kind is said to have been invented by Emperor Suy-yin of China, and the Chinese are thought to have used quipus till this form of keeping records was superseded by the art of writing. The Incas of Peru used quipus at the time those regions were invaded by the Spaniards, both for recording intelligence and conveying commands to officers. In some instances these devices were used for preserving accounts of historic events.

QUITO (kee'tō), the capital and largest city of Ecuador, in the province of Pichincha, near the eastern slope of the volcano of Pichincha. Its site is 9,350 feet above sea-level, and its pleasant and temperate climate makes it one of the most beautiful cities of South America. The atmosphere is almost constantly clear and bracing, and its climatic conditions resemble those of perpetual spring. Its principal streets are regularly platted and well paved, but those in the older parts of the city are narrow and neglected. There is a system of waterworks and sewerage, but the street lighting still consists of gas and kerosene lamps, while the absence of railroads and substantial highways greatly interferes with commercial enterprise. Among the important buildings are those maintained by the government, including the capitol, the president's palace, the courthouse, and the town-house. The University of Quito is the principal educational institution, but there are numerous schools and convents, a seminary, an observatory, several hospitals and asylums, a museum, and a public library of 25,000 volumes. The cathedral is a substantial structure, and it has a large number of other churches and monasteries. Quito is the seat of an archbishopric, and is noted as a gathering place and the home of many priests, fully 500 residing there. Among the manufactures are cotton and woolen goods, spirituous liquors, jewelry, hosiery, thread,

lace, and utensils. The city was founded by the Spaniards in 1534, and suffered at various times from the effect of earthquakes, particularly in 1859, when many lives and about $3,000,000 worth of property were destroyed. The inhabitants consist principally of descendants from Spaniards and Indians, but there are many pure-blooded Spaniards and Indians in the city. Population, 80,500.

QUORUM (kwō′rŭm), the name applied to such number of persons of any deliberative or corporate body as is necessary for the legal transaction of business. If no specific rule as to the number required has been adopted by the body, a quorum consists of a majority of the members. It is customary for most bodies to adopt rules providing that a majority of the members shall constitute a quorum, though a greater number may be required for special purposes, and in some bodies less than a majority may be made a quorum by a rule. For instance, forty members constitute a quorum in the British house of commons. The constitution of the United States provides that a majority of each house of congress shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may instruct the sergeant-at-arms to compel the attendance of absent members. It was held during the first fifty congresses of the United States that the constitutional quorum must be shown to be present by the count of votes, but in 1890 Thomas B. Reed, then speaker, ruled that he might decide a quorum to be present when enough members were visibly present, though some did not vote. This position has since been generally supported, and it is now held that if a majority be present to do business, their presence is all that is required to make a quorum in either house of congress.



TRAIN ON THE MOHAWK AND HUDSON RAILROAD, 1832.

R

R, the fourteenth consonant and eighteenth letter of the English alphabet, which is classed as a semi-vowel and a liquid. It is generally considered to have two sounds; one at the beginning of a word or syllable, or when it is preceded by a consonant, and the other at the end of a word or syllable, or when it is followed by a consonant. In the former case it is produced by an explosion of vocalized breath, the tongue almost touching the palate or gum near the front teeth with a tremulous motion; and in the latter it is formed by a vibration of the lower part of the tongue, near the root, against the soft palate. The former use is illustrated by such words as tree, ran, and morose; and the latter by the words her, star, and beard. The three R's, a term familiarly used to designate the three elementary subjects of education, reading, writing, and arithmetic, originated with Sir William Curtis. In this relation they are often spelled reading, 'riting, and 'rithmetic.

RABAT (rä-bät'), a maritime city of Morocco, in the province of Fez, 135 miles southwest of the Strait of Gibraltar. It is situated near the place where the Bu-Regreb flows into the Atlantic Ocean, and is defended by a wall, citadel, and batteries. It has many mosques, and the tower of Beni-Hassan, a structure 180 feet high. The city has manufactures of silk and woolen goods, carpets, saddlery, waterproofs and leather, and there is a considerable trade in wool, dye-stuffs, olive oil, wax, and tropical fruits, though commerce has somewhat declined on account of silt settling at the mouth of the river. Rabat was founded in the 13th century, and was long a haunt of pirates. Population, 27,390.

RABBA (räb'bä), a city of western Africa, in the native kingdom of Gando, on the Niger River, about 350 miles from its mouth. It has an extensive trade in ivory and tropical products. Among the manufactures are cotton and woolen goods. Population, 40,000.

RABBI (răb'bī), a title applied to persons having judicative and other special authority among the Hebrews, and corresponding in meaning to the English word master. The title was in common use among the Jews in the time of Christ, who was thus addressed by His disciples. It is now applied to any teacher who is not a priest, and especially to learned doctors of the Jewish law. Rabin is the equivalent French form, meaning my master; and rabbon is an Aramaic form, meaning our master.

RABBIT, a genus of rodent mammals belonging to the same family as the hares, though they are smaller and have shorter ears and hind legs. It is thought that rabbits were found originally in the western portion of the Mediterranean basin, but they have been widely naturalized and are met with in all regions, except those extremely cold. The color in a native state is

RABBIT.

almost uniformly brown, but under domestication it may become varied, including black, white, gray, and spotted. Like the hare, it is timid and seeks safety by rapid and continuous running, and by retreating to burrows excavated in hill slopes and sandy pastures. It is gregarious in habit, and in a wild state pairs for life, though in domestication it ceases to pair. The young are brought forth in litters numbering from three to eight, and are blind and naked at birth, but the mother attends to them with marked affection in burrows. They begin to breed at six months, and have several litters each year. The average life of a rabbit is from seven to eight years. They have well developed senses, but remain concealed the greater part of the day, coming out at early twilight to roam about in search of food. Rabbits feed on grass, herbage, vegetables, and bark, often inflicting considerable damage to young plants and orchards.

Many species of rabbits are widely distributed in America, among them the gray rabbit or cottontail. This species is particularly abundant in the Mississippi valley and the middle states, where it is hunted in the fall and winter for its flesh. The best time to go upon a rabbit chase is directly after a newly fallen snow, when these animals may be tracked successfully to their burrows or places of hiding. The flesh is not eaten during the summer, and is best in the fall, shortly after the animals have become fat on the grain found in the fields. Rabbits were not imported into Australia and New Zealand until 1860, but they are now a common pest in many sections for the reason that the climate is exceedingly favor-

able to their multiplication, and because few enemies are found there to diminish their numbers. In many sections they have become harmful to vegetation, eating and destroying crops, pastures, and young trees. Domesticated rabbits have been greatly modified by the skill of breeders, and now include varieties varying greatly in size and color. Albinos are very common among rabbits, and include a remarkable variety with white hair and red eyes. Besides being valuable for food, rabbits yield skins of use in making glue and size, and the hair is well adapted for felting purposes. The fur is of use in making articles of wearing apparel, or for imitating the rarer and more costly furs.

RABELAIS (rä-blā'), **Francois**, humorist and satirical writer, born in Chinon, France, about 1490; died at Paris in 1553. He was the son of a farmer, and about 1519 entered the Convent of Fontenay le Comte as a member of the Order of St. Francis. While there he devoted himself with much ardor to the study of Latin and Greek and many modern languages, including Italian, German, Spanish, Hebrew, and Arabic. In 1530 he was admitted as bachelor, and shortly after began the study of medicine at Montpellier, where he secured a medical degree and received an appointment as lecturer. In 1532 he was engaged as hospital physician at Lyons, and while there he published several works bearing on medicine and jurisprudence. He visited Rome with the bishop of Paris, Jean Du Bellay, whom he accompanied as traveling physician, and after returning to France continued the practice of medicine at Montpellier. In 1546 he settled as physician at Metz, but received an appointment as curé of Mendon in 1551, in which capacity he passed the remainder of his life. His treatises on scientific subjects have long since been forgotten, but his "Gargantua and Pantagruel" continues to be classed among the most humorous and grotesque masterpieces of the world. This work appeared in five books, but the fifth was left in manuscript. Rabelais is generally credited with a happy and blameless life, one devoted to the relief of suffering and the spread of culture. His publications place him before us as a moral and social reformer of abuses practiced in his time, and they may be regarded as satirical criticisms of the corrupt state of society of his age. The charge of irreligion and atheism was preferred against him and his works at different times, but there seems to have been little or no ground for such inferences, since his writings were characterized by the peculiar free tone assumed generally by him and his contemporaries.

RACCOON (răk-kōōn'), an American quadruped mammal of the bear family, which is found from Canada to the tropics, The head is broad behind with the muzzle narrow, the ears short, and the tail ringed and moderately long. Raccoons are somewhat larger than a large cat, but they are built more heavily, have short legs, brown furry hair, and claws well adapted for climbing trees. The body is about twenty-two inches long, and the tail measures twelve inches. They make their homes in hollow trees and burrows in the ground

COMMON RACCOONS.

during the day, but at night come out in search of food and water. The food consists of vegetable and animal matters, particularly of crabs, oysters, crawfishes, green corn, and tender shoots of plants. Their flesh is a favorite article of food, for which they are hunted in the fall and winter. The crab-eating raccoon is native to South America, and ranges as far north as Panama. It differs from the common raccoon of North America in having a more slender shape and shorter fur. Both species are remarkable for displaying a fondness for glittering things, a trait also found in magpies and jackdaws.

RACES OF THE WORLD. See **Ethnology**.

RACHEL (rā'chĕl). See **Jacob**.

RACHEL (rä-shĕll'), **Eliza**, tragic actress, born at Munf, Switzerland, March 24, 1821; died in Cannet, France, Jan. 3, 1858. She descended from Jewish parentage, but is usually classed as a French actress. Her father's name was Jacob Felix and her true name Elizabeth Felix, Eliza Rachel being her stage name. Both her parents traveled on foot through France as peddlers, and she joined a troup of Italian children at Rheims to earn her living as a singer in the cafés and on the streets. Her parents settled at Paris in 1830, where she received instruction from a teacher of singing who had been impressed with her talent, and in 1832 she was received in the Conservatoire. In 1837 she made her first appearance on the stage at the Gymnase at Paris, but attracted little attention until the following year, when she excited much admiration by appearing in the classic productions of Racine and Corneille at the Théatre Français. Her favorite roles included Camille in "Les Horaces;" Emilie in "Cinna;" Hermione in "Andromaque," and Monime in "Mithridate," but

she also played successfully in the modern characters of Judith and Cleopatra. She made a tour of Europe in 1849, visiting Berlin, St. Petersburg, Vienna, and London, and everywhere received applause and admiration. In 1855 she made a tour of the United States, but returned to Europe sorely afflicted with consumption of the lungs, Rachel had no rival in the height of her prosperity, and her immense success brought a large fortune, which she lavished in a most affectionate manner upon her whole family. It is said that she was grasping and avaricious in making contracts with managers of theaters, always dictating her own terms in the engagements, undoubtedly realizing that her services were in demand.

RACINE (ra-sēn'), a city of Wisconsin, county seat of Racine county, on Lake Michigan, sixty-two miles north of Chicago. It has an excellent harbor at the mouth of Root River, and is well provided with railway and navigation facilities. Among the municipal improvements are substantial street pavements, electric lights, street railways, and public waterworks. The manufactures include furniture, carriages and wagons, steam engines, lumber products, linseed oil, woolen goods, rubber clothing, machinery, malted milk, and farming implements. Among its public institutions are the Racine Academy, Racine College, McMurphy Home School, St. Catharine's Academy, St. Luke's Hospital, and the Taylor Orphan Asylum. It has numerous public schools and four excellent libraries. Racine has a growing domestic and foreign trade, and is surrounded by a fertile farming and dairying country. The first settlement on its site was made in 1834. Population, 1900, 29,102.

RACINE (rä-sēn'), **Jean Baptiste**, dramatic poet, born at La-Ferté-Milon, France, Dec. 21, 1639; died in Paris, April 22, 1699. Both his parents died while he was yet young, and he was raised by his maternal grandmother, who sent him to the College of Beauvais at an early age. His grandfather died when he was sixteen years of age, and he was sent to Port Royal to live with other relatives, and there he studied advanced branches and languages. His educational study was finished at the College d'Harcourt, where he met distinguished scholars and formed a devotion for a life of letters. His first tragedy was acted at the Palais Royal Theater by Molière's company in 1664, and in the following year his "Alexandre" was presented on the stage. This production placed him before the public as a rival of Corneille, and he was granted a pension of 600 francs by the king for a congratulatory ode. From this time he wrote many plays showing extraordinary genius, among them his celebrated "Andromaque," a production in which Rachel appeared with much success as Hermione. In 1677 he married a devout lady, who became the mother of two sons and five daughters, and the later part of his life was spent principally in several public offices under the king. These included an engagement as historiographer with Boileau, in which capacity he accompanied the king in his campaign to Flanders. Racine was essentially French in his dramatic writings, and besides them produced a number of odes, hymns, and epigrams. He is held to be without a rival in the grace and tender style of his writings.

RADCLIFFE (răd'klĭf), **Ann Ward**, novelist, born in London, England, July 9, 1764; died there Feb. 7, 1823. She descended from a family named Ward, and in 1787 married William Radcliffe, a student of law, who became editor of "The English Chronicle." She is preëminent as a writer of novels characterized by poetic imagination, and possessed remarkable power of description and romantic narration. Her best known works include "Romance of the Forest;" "Mysteries of Udolpho;" "The Italian;" "Sicilian Romance;" "Journey Through Holland," and "Gaston of Blondeville." She received $1,500 for the copyright of "Mysteries of Udolpho," and $2,000 for that of "The Italian," which sums were regarded excessive at that time.

RADETSKY (rä-dĕts'kee), **Joseph Wenceslaus, Count of**, eminent soldier of Austria, born at Trebnitz, Bohemia, Nov. 2, 1766; died in Milan, Italy, Jan. 5, 1858. He descended from a noble family, entered a cavalry regiment in 1784, and served against the Turks under Joseph II. in 1788-89. It may be said that he took an eminent part in all the great battles of Austria, among them the battles of Hohenlinden, Wagram, and Leipsic, and in 1814 accompanied the allied forces into Paris. In 1830 he was called to Italy to suppress the disturbances that followed the French revolution of that year, and in 1831 received full command of the Austrian army in Italy. He was made field-marshal in 1836, and in 1857 retired from the service.

RADIATOR (rā-dĭ-ā'tẽr), a hollow vessel or coil of pipe through which is passed steam, hot water, or air for warming a building or apartment. Coils of pipe are used principally, and the arrangement and appearance is varied. In heating by steam it is necessary to provide a boiler partially filled with water, which is connected with the radiators in the different apartments by pipes. Provisions are necessary by which all the condensed steam may return automatically to the boiler, as otherwise the radiator would soon fill with water and cease to radiate heat. Systems utilizing water are constructed in much the same way, differing only in that a continuous system of pipes articulates with a heater. These and the radiators are filled with water, which begins to circulate under the expanding influence of the heat applied in the heater, and a constant inflow of water is provided from a supply tank located in an upper story or

from a city water system. Pipes passing through basements or parts not intended to be warmed should be protected by asbestos wrapping, thus preventing the needless radiation of heat.

RADIOMETER (rā-dĭ-ŏm′ē-tĕr), an instrument for estimating the mechanical effect of radiant energy. It was invented by William Crookes, and was first exhibited at the Royal Society, London, in 1875. The radiometer consists usually of a globe of glass from which the air has been exhausted, and in it is a needle support carrying a rotating four-disk vane, colored white on one side and black on the other. When the instrument is exposed to light, revolution begins immediately, and its speed depends upon the intensity of the light. Twice the effect is produced when two candles are placed near it instead of one, and the vanes may be made to spin with great rapidity by exposure to an incandescent electric light.

RADISH (răd′ĭsh), a fleshy plant grown extensively as a garden vegetable. It is thought to be native to India, where it was

EARLY RADISHES.

cultivated in ancient times, and was brought from that country to Europe and America. The radish is planted for its root, which is eaten as a salad or relish when young. Gardeners usually sow the seed at various times in the same year, thus insuring young and tender plants at different periods, the older insipid and woody growths being inedible. There are many varieties of radishes, but all may be classed under two divisions, the long-rooted and the turnip-rooted. The root of the former resembles a carrot in form, and the latter a turnip, but the color in each variety is greatly variegated.

RADIUM (rā′dĭ-ŭm), a remarkable radioactive metal discovered in 1898 by M. Curie, of France. It is obtained from pitchblende, a mineral consisting largely of oxides of uranium, but is difficult to procure in a pure state. It continually emits radiations of light and heat without combustion or an apparent loss of bulk or energy. Pure radium does not exist as a metal.

RAE (rā), **John**, Arctic explorer, born in the Orkney Islands, Scotland, in 1813; died in London, England, July 21, 1893. In 1846 he made a journey to Repulse Bay, and joined the expedition under Sir John Richardson that went in search of Franklin in 1848. Five years later he proved by an accurate survey that King William's Land is an island, and discovered many relics of Franklin's party. The British government awarded him $50,000 for these services. He began a system of surveys in 1860 with the view of locating a telegraph line to America by way of the Faroe Islands and Iceland, and in 1861 made extensive explorations and surveys on the Fraser River and the Rocky Mountains of Canada. Rae published a number of interesting reports on the Esquimos and his Arctic expeditions.

RAFF, Joseph Joachim, musical composer, born near Zurich, Switzerland, May 27, 1822; died June 25, 1882. He was born of German parents, studied at Schwyz, and formed the acquaintance of Mendelssohn and Liszt, who inspired the young musician by warm commendations. In 1850 he settled at Weimar to secure inspiration from Liszt, and there wrote many of his best known works. He married Doris Gemast, a reputable actress, in 1859, and in 1877 became director of the Conservatoire at Frankfort, a position he held until his death. Raff belonged to the Wagner school of musicians. He displayed remarkable fertility of invention, and all his works portray high artistic skill. Among the best known are "Dame Kobold," a comic opera; "King Alfred," a historic opera; and "Lenore" and "Im Wald," two symphonies.

RAGLAN (răg′lăn), **Fitzroy James Henry Somerset, Lord**, field-marshal, born Sept. 30, 1788; died June 28, 1855. He was the youngest son of the fifth duke of Beaufort, entered the army in 1804, and served on the staff of the duke of Wellington in the Peninsular War. Wellington engaged him as secretary for the latter part of that war, and he distinguished himself in the capture of Badajoz. He lost his right arm in the battle of Waterloo, but immediately began practicing writing with his left hand. In 1816-19 he served as secretary to the embassy at Paris, and from 1819 to 1852 as military secretary to the duke of Wellington. He attended the congress of Verona in 1822 in company with the duke, and after 1852 served as master-general of ordnance. The house of lords created him baron of Raglan in 1852, but he had previously been a member of the house of commons for Truro, from 1818 to 1826. He was made commander of the English forces at the beginning of the Crimean War, in 1854, becoming field-marshal for services in the battle of Inkerman. His death resulted shortly after from dysentery.

RAGSTONE, a rough, impure limestone rock, which breaks into rag-like fragments.

It is well adapted for whetstones used in sharpening steel instruments. The name is applied to hard, irregular rock overlying better grades of building materials, but which is used for building purposes.

RAG TRADE, the traffic in fragments of textile materials. Formerly these commodities were regarded valueless, but now they form important materials in various manufactures. Rags are collected at present with considerable care in all countries, but for centuries they were allowed to waste or were used to a very limited extent in stuffing saddlery. They are gathered in large quantities in the United States by persons traveling from house to house, but the demand for them is greater than the supply; hence considerable quantities are imported from foreign countries. Linen and cotton rags are consumed almost exclusively in the manufacture of paper. Bank notes, ledgers, and papers of light quality are made mostly of rags, but printing paper is made largely by mixing wood-pulp with rags. Rags of woolen or worsted goods are not used in paper-making, but are carefully sorted, the inferior portion being used for manure, while all the available loose texture is unraveled by machinery and after mixing with good wool, is made into goods generally known as shoddy. The refuse matter remaining after carefully selecting the different grades is pulverized and used in making flock papers. In London and many other European cities companies are maintained to collect rags by utilizing the labor of children. This plan is employed in the larger cities of America, while in the country districts venders of trinkets and merchandise collect rags and fragments of metals, usually paying for them with tinware or small articles, such as handkerchiefs.

RAGUSA (rä-gōō'sä), a maritime town of Austria, in the southern part of Dalmatia, about forty miles northwest of Cattaro. It was formerly an independent republic, but now possesses little of its former prosperity. Among the manufactures are clothing, oil, silk, leather, tobacco, soap, and utensils. It has a considerable export trade. Ragusa was founded about 656 by refugees from a city of the same name in Sicily, and in the time of the Byzantine Empire enjoyed a flourishing trade and important educational and manufacturing institutions. It became subject to Venice in the 12th century, but formed an independent republic at the beginning of the 15th century, which was finally overthrown by Napoleon in 1808. Both the town and the province became a part of Austria in 1814. Population, 7,625.

RAGUSA, an ancient city of Sicily, thirty miles southwest of Syracuse, and fifteen miles from the sea. It is situated on the Ragusa River, and occupies a site in the midst of a productive agricultural and stock-raising region. Among the manufactures are cotton textiles, woolen and silk goods, oil, wine, and utensils. In its vicinity are a number of ancient tombs, and the city is surrounded by a substantial wall. Population, 27,865.

RAHWAY (ra'wā), a city of Union county, New Jersey, on the Rahway River, sixteen miles southwest of New York City. It is conveniently connected with eastern cities by railways, has numerous churches and schools, and enjoys a large commercial trade. The manufactures include carriages, clothing, woolen goods, utensils, and machinery. Gas and electric lights, telephones, waterworks, and rapid transit are among the improvements. Population, 1900, 7,935.

RAIKES (rāks), **Robert**, the founder of Sunday schools, born in Gloucester, England, Sept. 14, 1735; died April 5, 1811. He succeeded his father as proprietor of the "Gloucester Journal" in 1757, and managed that periodical till 1802. In 1780 he originated the system of Sunday schools by gathering a number of children from the streets for religious training. The last thirty years of his life were devoted largely to promoting schools of this kind, and he lived to witness the extension of the Sunday school system throughout England.

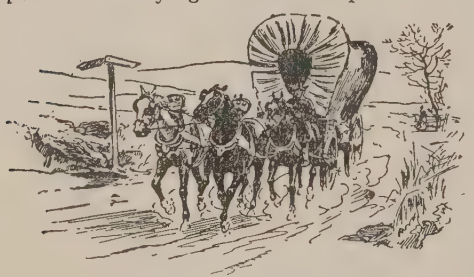
RAIL, a genus of birds that includes about 150 species, which are distributed throughout the world. They include the

VIRGINIA RAIL

rails proper, the water hens, the coots, and the crakes. The water rail of Europe and the Virginian rail of North America are quite similar and form representative types of this class of birds. They have a long bill, long and powerful legs, an olive-brown or a bluish-ash color, and are about eleven inches in length. These species are highly esteemed for their flesh. The Virginian rail is a bird of passage. It feeds on worms, mollusks, and soft vegetable substances, and is abundant in many parts of North America. It is very shy in its habits, and when detecting danger escapes by passing swiftly through the reeds rather than by flight. The fresh-water marsh hen is about twenty

inches in length, and is abundant in the marshes of the southern states. Its body is eighteen inches long; the bill is three inches, and the weight is nearly two pounds. The mangrove hen is native to the West Indies, where it is found along the muddy shores and in marshes. The land rail is commonly known as corn crake, and is about half the size of a partridge, but appears quite as large as that bird.

RAILROADS, or **Railways**, the graded roads having one or more tracks of metal rails supported by sleepers, and designed for the passage of rolling-stock. It may be said that railroads are exclusively modern institutions, though similar improvements were utilized in a primitive way by the ancients. The Romans constructed grades and built tracks of two lines of dressed stones, connected end to end, so as to form hard, continuous surfaces for the passage of vehicles drawn by horses. Similar tracks constructed of two parallel lines of wooden beams, having flanges to prevent the wheels of the cars from leaving the track, were built in many parts of Europe early in the historic period. However, these were built principally within mines for transporting material to the place of exit, or for the purpose of conveying the mineral products to



PRIMITIVE MODE OF TRAVELING.

the places of use or shipment. Tramways were in general use in connection with the mines of Europe in 1662, and about that time they began to be used for conveying freight. The rails consisted of timber, and in 1676 additional wearing rails were provided to replace those worn out, and later flat strips of iron were nailed on the surface to add greater durability.

Cast iron rails were first used in 1767. They were made in lengths of five feet, and a cast iron flange was soon after added to serve in keeping the wheels on the track. Nicholas Cugnot, a Frenchman, was the first to invent a steam engine of practical service in moving cars on a railway track. His engine was completed in 1769, and is preserved as a remarkable curiosity in Paris, and a full-sized model of it may be seen at the Chicago Field Columbian Museum. It has a pair of single acting thirteen-inch steam cylinders, by which power is communicated to a single drive wheel, and was designed for transporting artillery. Though important as leading to the perfection of the steam engine, it is a mere toy when compared to the vast machines of modern structure.

The invention made by Cugnot stimulated many mechanical engineers and scientists of Europe to devote marked attention to the construction of a machine that would combine the qualities necessary to move cars safely and rapidly over rails. This ambition to add materially to practical engineering also spread to America, and Oliver Evans, of Philadelphia, obtained a patent on steam carriages in 1787. Railroad building was delayed for many years on account of the construction of canals in many sections of Europe and America, and it was argued that no form of transportation could surpass water navigation from the standpoint of safety and limited freight or passenger rates. This view has since been proved entirely correct, but railroad building still remained a favorite theme of study, since it was desired to secure greater rapidity, and to establish highways of travel and commerce where water navigation could not be utilized. It may be said that Oliver Evans is the inventor of the high-pressure double-acting steam engine; his first product of this class was completed in 1800. However, England claims that honor for Richard Trevetick, who about the same time constructed an engine to draw wagons on rails. Oliver Evans (q. v.) built a steam dredge in 1804, which was the first steam-propelled vehicle made in America that moved successfully. There was long a mistaken notion that locomotives could not do their work successfully without having spur-wheels, and mechanical engineers conformed their engines and tracks along that view, but a coal operator of England, in 1812, successfully demonstrated that smooth wheels run more easily and successfully on smooth rails. This having been satisfactorily established, nothing more was needed than to provide a machine that would possess the desired amount of speed. In 1814 George Stephenson made a practical success in building a locomotive for railroad use. It was built with money advanced by Lord Ravensworth, and ran thirty-five miles an hour. The first railway opened in England was that from Stockton to Darlington in 1825, and the second that from Liverpool to Manchester in 1830.

The first railroad constructed in America was projected in 1825, and extended from Quincy, Mass., to the nearest tide-water, about four miles. It was completed the following year and used principally for carrying granite from the quarries near Quincy. The second railroad extended from mines near Mauch Chunk, Penn., to the Lehigh River, and was completed in 1827. The New York Central was projected in 1825; the Boston and Albany in 1827, and the Baltimore and Ohio in 1828; and in 1830 there were twenty-three miles of railroads com-

pleted in the United States. The engines used were of the Stephenson make and were imported from England. Since then many vast improvements have been made in

MODERN MODE OF TRAVELING.

building railroad tracks and rolling-stock, and lines penetrate all sections of the United States. The United States has the largest railroad mileage of any country in the world. There has been a marvelous extension of railroad mileage since 1830; not a single year has passed without material additions being made to the value and utility of these necessary highways of modern commerce. At the beginning of the Civil War, in 1861, there were 29,739 miles of railroads in this country, and in 1873 there were 70,268 miles. The following table contains an exhibit of various interesting matters in railroad development during the decade ending with the last census of the United States:

YEAR.	TOTAL MILEAGE.	TOTAL CAPITAL.	TOTAL DEBTS.	NET EARNINGS.
1891.....	164,686	$4,809,176,751	$5,233,295,074	$356,209,880
1892.....	170,499	4,920,556,225	5,463,611,204	358,638,520
1893.....	173,012	5,080,032,904	5,570,293,613	364,591,109
1894.....	176,919	5,075,629,070	5,665,734,249	322,539,276
1895.....	179,198	5,231,373,652	5,712,052,517	327,505,716
1896.....	180,891	5,200,600,725	5,690,970,314	332.333,756
1897.....	184,603	5,230,924,860	5,720,828,215	338,170,195
1898.....	187,340	5,240,728,254	5,727,364,201	341,244,580
1899.....	190,833	5,262,286,561	5,753,123,790	356,280,760
1900.....	195,133	5,276,524,380	5,800,5428,70	361,080,203

The first work in railroad building is to make a survey of the projected route between two places for the purpose of ascertaining the most practicable line, and for setting grade stakes to indicate the amount of cuts and elevations to be made. It is aimed to make the line as nearly level and straight as possible, since both are important in facilitating speed and promoting traffic without needless expense. To do this it is generally made an object to follow the valleys of streams wherever practicable, though in many sections it is necessary to penetrate hilly and mountainous regions. In an undulating country railroad builders aim to have the cuts supply the necessary amount of earth to build the embankments required in carrying the grade over depressions. Tunnels are cut only through the higher hills and mountains. In many regions where snow storms or snow slides prevail it is necessary to protect the portions of railroad tracks passing through cuts by snow fences. After the grading is completed, ties or sleepers are placed across the grade at a distance of about twelve inches from each other, the wood commonly used for that purpose including white oak, yellow pine, chestnut, and hemlock. At present the rails are made almost exclusively of steel. They are spiked at a certain distance or width from each other, called the gauge. There are three different gauges, which are generally known as narrow, standard, and broad. In the United States the railroads are chiefly of the standard gauge, and the rails are made principally of the T steel, so called from its resembling the form of the T turned upside down. One pair of parallel rails constitutes a single track of railway; two pairs a double track, and with each system are a number of side tracks connected with the main line by switches.

The cost of building the railroad lines is only a portion of the general expense to be considered in construction and operation, since depots, freight offices, telegraph lines, and rolling-stock are all important items to be added in estimating the general cost. Cars for the transportation of freight are variously constructed, and include those designed particularly for way-freight, grain, coal, oil, fruit, and other perishable commodities. The express and postal business is largely in connection with passenger trains, though on some lines the express and postal service is carried on trains designed especially for those purposes. The Baltimore and Ohio railroad issued the first timetable for passenger trains in the United States in 1830. Sleeping-cars were made as early as 1837; dining-cars came into use in 1867, and George M. Pullman patented the vestibule car in 1887. Passenger trains of the first-class are made up of cars fitted with two six-wheel trucks. They have electric or gas lights, hot water or steam heating, automatic air-brakes, and automatic couplers, and include vestibule cars for dining and sleeping. In some of the finer cars are apartments containing a barber shop, a smoking room, a bath room, a library, etc. The block signaling system is used on all first-class lines, thus providing practical safeguards against danger.

The closing years of the last century were not only marked with great activity in railroad building in the United States, but many of the countries of Asia and Africa have followed the lead made by America and Europe. Thousands of miles of lines are either now in operation or projected, and it is only a question of a few decades until practically all the interior commerce will be carried by railways, instead of by caravans and over highways, as is now the case in some of the less progressive countries. There is also marked activity in promoting the building of electric railways, both in America and Europe. They are now utilized principally for urban passenger traffic, but are begin-

ning to extend into suburban and rural districts for the conveyance of passengers and various forms of merchandise. In the large cities railway lines are built above the streets, partly to overcome the dangers attending crowded streets, and to make it possible to provide greater rapidity in the transit. There are extensive systems of elevated street railways in New York, Chicago, Berlin, London, Paris, Vienna, and other great cities of the world. Besides, underground railways are operated in New York, Paris, London, and other large cities. The electric railways of the United States aggregate 20,780 miles, and there is a notable tendency to increase the lines and to extend the elevated and underground railway mileage. The total railroad mileage of the world is placed at 513,622 miles, of which 222,300 miles are in North America. The following is the mileage of railroads in the grand divisions according to the latest accounts: North America, 222,300; Europe, 176,620; Asia, 45,890; South America, 35,360; Africa, 16,240, and Australasia, 16,212.

RAIN, the condensed vapor of the atmosphere falling to the earth in drops large enough to obtain sensible velocity. It differs from mist in that the latter falls in very small drops or particles; and from fog, which is composed of particles so fine as to be not only individually indistinguishable, but to float or be suspended in the air. There is always a large amount of watery vapor in the air, but warm air is capable of holding a much larger quantity than cold air. The vapor suspended in the atmosphere is derived by evaporation of water from the surface of the earth, by far the larger part being taken up from the ocean, though there is a considerable evaporation from the land and interior bodies of water. The quantity of moisture that the atmosphere may hold depends upon the temperature, and when it contains all that it is capable of holding it is said to be saturated, or at its dew point. To produce rain, it is necessary that the temperature of a large mass of air be reduced considerably below its dew point. This condition may be brought about by a change of latitude, that is, a warm moisture-laden wind may blow into a cold region; or by a change of altitude resulting from an ascending current of air carrying the moisture of the lower strata into the upper regions. It is mainly in the latter manner that the rains of the tropical regions are caused, but the effect is similar in mountainous districts when a moist wind reaches a mountain range and is forced to ascend the slopes. Rain is also caused by the mingling of masses of cold and warm clouds, though the precipitation from this cause is never considerable, since the colder air becomes warmed by the mixing, and thus acquires greater capacity for holding moisture.

As rain-drops fall through the cloud they become larger by other drops uniting with them; thus their size depends upon the density of the cloud. They are generally larger in the daytime than at night, and in the tropics than in the polar regions. The air is purified by rain falling through it, and by the mixture of the upper and lower strata of air resulting from its passage through the strata. Rain has a wholesome effect upon the earth, since offensive gases are washed from the surface by water flowing over it or passing into the soil. Fresh rain-water contains a small quantity of ammonia and carbonic acid, on account of which it has a more wholesome effect upon plants than that derived from wells and springs. A great variety of circumstances affect the quantity of rainfall in different localities; principal among them are nearness to the sea, exposure to prevailing winds, latitude, altitude, and the presence of mountain ranges. Rainfall is also affected by the presence of vegetation, since an abundance of vegetable forms tends to aid condensation by keeping the soil cool, while a desert region becomes highly heated and directly counteracts condensation. More rain falls in the tropics than in the temperate regions, and more in the temperate than in the polar regions. This is due to a decrease in the quantity of heat and evaporation with moderate regularity from the equator toward the poles.

The distribution of rain determines in a large measure the material industries of the people, since without moisture a region is a mere desert and the subsistence of animal and vegetable life is either entirely impossible or greatly limited. The supply of rain in the vast interior of North America depends upon the winds blowing from the Gulf of Mexico. These winds are influenced in a measure by the elevated ranges of the Sierra Madre Mountains, in Central America and Mexico, and thus are directed to spread themselves over the great basin of the Mississippi River. The movement of these winds may be traced from the equatorial regions to the vicinity of the peninsula of Yucatan, and as they proceed toward the north and west they appear to be elevated by a counter-current of colder winds near the surface. In moving from the lower to the higher latitudes they gradually give off their store of moisture. The quantity required in the upper part of the valley is perceptibly less than in the southern part, since the temperature is noticeably lower; thus the valley is adequately watered from the Gulf of Mexico to the regions extending far into Canada.

The Atlantic coast plain and the western slope of the Pacific derive an abundance of moisture from the respective oceans, but there is a considerable shortage of rainfall in the Pacific highlands and the slopes of the Rocky Mountains. Among the vast arid regions are the Sahara and Kalahari deserts of Africa; the Arabian, Tarim,

(Opp. 1560.)

A CABLE RAILWAY.

No ascent is too steep for modern railroad engineering. (See page 264.)

and Gobi deserts of Asia; the coast of Peru, and the great interior of Australia. On the other hand, there are regions where rain falls almost daily or periodically with great excess, such as Patagonia, the lake regions of Africa, parts of India, and the northern part of Brazil. The quantity of rain which falls in a given time on any area is determined by means of an instrument called the rain gauge. The following statistics show the average rainfall of various places of interest: Cherrapongee, India, 610 inches; San Luis de Maranhao, Brazil, 280 inches; Paramaribo, Guiana, 229 inches; Havana, Cuba, 91 inches; Sitka, Alaska, 90 inches; western Sweden, 82 inches; southern Germany, 27 inches; British Islands, 40 inches; Washington, D. C., 38 inches; and San Francisco, California, 23 inches. The average rainfall in the United States in the semi-tropical zone is 39 inches, and in the temperate zone 34 inches.

RAINBOW, a luminous arch appearing in the clouds opposite the sun, and due to the refraction, reflection, and dispersion of light in drops of water falling through the air. The light is thus decomposed into its simple colors, which always appear in the same order; namely, violet, indigo, blue, green, yellow, orange, and red. A perfect rainbow consists of two concentric arches, the inner or brighter being called the primary bow, while the outer or fainter arch is called the secondary bow. In the primary bow red is the outer color and violet the inner, while in the secondary bow the colors are dimmer and arranged in a reverse order, this being due to a double reflection within the drops. Rainbows are seen only when the sun is 40° or less above the horizon, and occur both in the morning and in the evening. Only a part of the rainbow is seen, since a portion of it is below the horizon, but an observer standing on the top of a high mountain can see a greater part of it than an observer occupying a lower altitude. The bow is circular in form because the red ray of the primary bow forms an angle of about 42° when it leaves the drop, and the violet forms one of 40°. The occurrence of a broken rainbow is due to only parts of the field being filled with falling rain, or to the sun being obstructed from parts of it. Rainbows forming a complete circle are caused by the rays of the sun falling on the spray rising from a waterfall or cataract, but this phenomenon is of rare occurrence. They are formed occasionally by the light of the moon, called lunar rainbows, but these are not so bright as those seen in daytime.

RAIN GAUGE, or **Pluviometer**, an instrument for measuring the amount of rain which falls on any given surface. The measurement of rainfall has long been regarded important, and various contrivances to secure fairly accurate tests have been devised. The form generally used consists of a cylindrical vessel with a horizontal base, surmounted by a funnel-shaped top into which the rain enters. A glass tube with an attached scale is connected with the lower part of the cylinder. As the water enters the cylinder it rises in the glass tube, and it becomes an easy matter to read the quantity of rain fallen in inches by observing the scale. It is necessary to place the rain gauge in a position free from eddies and whirls. The rain-water accumulated may be emptied by means of a stop-cock at the bottom. It is quite important to locate the instrument as near the general level of the region to be tested as possible, since rainfall is more abundant near the ground than at some distance in the air. This was verified in a practical test made at Des Moines, Iowa, where it was found that the rainfall near the general level of the region for one year reached 30.2 inches, while at a height of 150 feet above the general level it was only 24.8 inches. Automatic rain gauges now made have a graduated scale for estimating the rainfall collected by the funnel. They indicate the duration of each shower as well as the rate at which the water falls. The fall of snow, in a melted condition, is always included when speaking of the rainfall of a country.

RAINY LAKE, an inland lake of North America, which forms part of the boundary between Minnesota and Canada. It is situated 160 miles west of Lake Superior. Rainy Lake is about forty miles long, has an average width of five miles, and is 1,160 feet above sea-level. It has numerous small islands and valuable fisheries. Rainy Lake River, a stream about one hundred miles in length, carries its surplus water into the Lake of the Woods.

RAISIN (rā′zĭn), the dried fruit prepared from the grape, and used for dessert or in cookery. The species of grapes containing a large quantity of sugar are of greatest value in making raisins. There are several methods, those of inferior quality being dried in an oven. The best grades are made from choice grapes by cutting half through the fruit-stalk without detaching it from the tree, thus leaving the cluster to shrink and dry by the heat of the sun while on the vine. Another method is to dip each bunch of grapes into a solution of lye made of the ashes of the burned tendrils, after which the fruit is dried by exposure to the sun. Large quantities of raisins are produced in California, but the principal producing countries are Spain, Asia Minor, Egypt, and other regions adjacent to the Mediterranean Sea.

RAJAH (rä′jä), or **Raja**, a title borne originally only by the princes of the Hindu race, but it is now conferred by the British government upon Hindus of rank. Anciently the title was borne only by the military caste and powerful princes, but it is now assumed by land-holders and members of inferior castes.

RAKE, an implement with teeth or tines,

which is used for collecting loose material or smoothing and evening a surface. The hand implements with parallel teeth fixed at right angles to a long handle are the simplest form of rakes. The horse rakes now used by farmers are two-wheeled implements. They are drawn by one or two horses, and are provided with curved tines between the wheels for gathering hay into wind-rows and cocks.

RALEIGH (ra'lą), the capital of North Carolina, in Wake county, near the Neuse River. It occupies an elevated site in the upper valley of the Neuse, has excellent railroad facilities, and is surrounded by a fertile region. The city has important manufactures of tobacco products, cotton-seed oil, machinery, clothing, agricultural implements, marbleware, carriages and wagons, paper, furniture, cotton goods, and flour. It is provided with electric lights and street railways, has a water system and sewerage, and contains libraries aggregating fully 75,000 volumes. Raleigh has a number of excellent state and county buildings, and a fine public school system. Among the institutions of higher learning are St. Mary's School, Peace Institute, Raleigh Male Academy, Shaw University, St. Augustine Collegiate Institute, and Latta University. The state capital is a fine structure of granite. Raleigh was incorporated in 1794. Population, 1900, 13,643.

RALEIGH (raw'lĭ), **Sir Walter**, navigator and statesman, born in Devonshire, England, in 1552; executed Oct. 29, 1618.

SIR WALTER RALEIGH.

He descended from an ancient English family, entered Oxford University in 1566, but in 1569 left that institution without graduating to aid the French Protestants under Coligny. Later he joined a military force sent by Queen Elizabeth to aid the patriots in the Netherlands in their struggle against Spain, and in 1580-81 attained eminence by aiding to suppress a rebellion in Ireland. Raleigh was a man of handsome figure, with a tall form, lofty forehead, and dark hair, and his imposing personality made him quite a favorite at the court of Elizabeth. He formed a scheme to colonize America in 1579 and was granted a charter for that purpose, in which enterprise he was assisted by his half-brother, Sir Humphrey Gilbert. His expedition was at first apparently successful in privateering against the Spanish, but his efforts to found permanent colonies in Virginia were made unsuccessful by Spanish encroachments. A large share of the forfeited estates of Ireland were granted to him in 1584. Soon after he introduced the culture of the potato in Ireland, and was granted special trade privileges to strengthen his colonization scheme in America. He was knighted in 1585, and became captain of the queen's guard in 1587. In 1588 he rendered services against the Spanish Armada, and subsequently equipped vessels to drive the Spanish forces from strategic points. He privately married Elizabeth Throckmorton, a maid of honor of the queen, in 1593, and thereby incurred the temporary displeasure of her majesty. While banished from court, he headed an expedition to Guiana, where he hoped to discover the fabled El Dorado, a supposed region of gold and gems, for which he embarked in 1595. This expedition resulted in nothing more than taking possession of the country in the name of Elizabeth, and on returning he published an account of the journey. Elizabeth reinstated him to royal favor shortly after his return, and gave him a naval command in 1596 under the earl of Essex and Lord Howard, who sailed to destroy the Spanish fleet and capture Cadiz. The enterprise terminated in success largely on account of efforts put forth by Raleigh. He further served the queen by capturing Fayal, in the Azores, in 1597, and became governor of Jersey in 1600, but his brilliant career ended with the death of Elizabeth in 1603.

James I. had well established prejudices against Raleigh, and immediately deprived him of every official position. He was accused of being implicated with Lord Cobham in a treasonable plot to secure the throne for Arabella Stuart, and, after a trial at Winchester, was found guilty and sentenced to be executed. This sentence was afterward commuted to life imprisonment in the Tower. He was confined there for twelve years, and spent his time in literary and scientific research. His release was secured in 1616 by proposing to lead an expedition to the Orinoco River for the purpose of developing a vast gold field that he thought could be found. The enterprise not only proved disastrous, but brought on trouble by Raleigh's men attacking and destroying a Spanish village. He was arrested on returning to England, and was executed on the former sentence that still remained in force. Raleigh was a man of lofty moral impulse and noble presence. He possessed a spirit of rare wit, but had proud and impatient traits that were largely instrumental in bringing about his ruin. While in the Tower he wrote his "History of the World."

RAM, an ironclad ship-of-war having its bow especially designed and constructed for ramming. Such a vessel has a heavily armored stem at the bow below the line of water, and is intended to destroy the enemy's ships by driving against them with great

force, the collision being designed to crush the side of the attacked vessel without injuring the ironclad. Vessels of this class were first employed in the Civil War, when the Confederate ram Virginia sunk the Federal frigate Cumberland at Norfolk Roads in 1862. The ram is now regarded one of the most efficient vessels for coast defense.

RAMA (rä'mä), in Hindu legends, the hero of the Ramayana, who made his appearance in the world at the end of the Treta Yuga or second age, and is called the seventh incarnation of Vishnu. He is generally spoken of as Rama-chandra. There are two other incarnations of Vishnu bearing the name of Rama, who are known as Balarama and Parasa-rama.

RAMADAN (răm-à-dăn'), the ninth month of the Mohammedan year, and the one in which Mohammed received his first revelation. It is for this reason the great annual fast month and festivities are kept up throughout the entire period from sunrise to sunset. All believers are enjoined to abstain from eating, drinking, and sensual pleasures during the entire day, but food may be taken at night to supply the necessary wants of the body. The obligations enjoined upon believers during Ramadan are treated in the second book of the Koran, called The Cow. Since Mohammedan months are reckoned by lunar time, each month begins in each successive year eleven days earlier than in the preceding, hence it occurs successively in all the seasons in a period of thirty-three years.

RAMAYANA (rä-mä'yà-nà), one of the two great epic poems of India, the other being known as Mahábhárata. This poem is the accredited work of Valmiki, and recounts the famous exploits of Rama, king of Oude, who was one of the conquerors of Ceylon. It consists of 2,400 stanzas, arranged in seven books, and is thought to have been composed in the 5th century A. D. There are many translations and criticisms on this work, which may be classed as the most celebrated poem in India. The translations of Schlegel are especially noteworthy.

RAMESES (răm'ę-sēs), the name of several kings of Egypt, who are supposed to have reigned about the time the children of Israel were connected with the Egyptians. Rameses I. was the first sovereign of the nineteenth dynasty. He reigned but a short time, and his name appears on the monuments of Thebes. Rameses II. was the grandson of the preceding, and is classed as the third king of the nineteenth dynasty. His birth is assigned to the 15th century B. C. The inscriptions on various tombs and monuments give him a place as a patron of art and science and a builder of many vast improvements. It was during his reign that the Israelites became sorely oppressed, and under his son, Rameses III., who is generally known by his title, Pharaoh, the exodus of the Hebrews took place. The latter monarch belonged to the twentieth dynasty. Writers generally agree that the mummies of Rameses I. and Rameses II. were found in a pit near Thebes in 1881, and that the mummy of Rameses III. was discovered among papyri and other relics in 1886.

RAMILLIES (rà-mē-yē'), or **Ramilies**, a town in Belgium, twenty-eight miles southeast of Brussels. It is noted as the seat of an important battle in the War of the Spanish Succession, which occurred on May 23, 1706. The French forces were commanded by Marshal Villeroy and the elector of Bavaria, while the allied troops were under command of Marlborough. The former were defeated with a loss of 13,000 men, and France was compelled to abandon its claim to the Spanish Netherlands.

RAMPART, the embankment surrounding a fort, on which the parapet is raised, and which is designed with the view of resisting cannon shot. It is constructed immediately within a ditch, the lower part of the outer slope being usually made of solid masonry, and the remainder being formed by the earth taken from the ditch. The height of the rampart is determined largely by the height of the buildings to be defended, and by the character of the region surrounding the fort.

RAMSEY (răm'zĭ), **Alexander**, statesman, born near Harrisburg, Penn., Sept. 8, 1815. He graduated from Lafayette College, and soon after engaged in a political career. In 1841 he was made clerk of the Pennsylvania house of representatives, and was elected to congress in 1842 as a whig, serving four years. He became the first territorial governor of Minnesota, holding office till 1853. Two years later he was elected mayor of St. Paul, and served as governor of the state in 1860-63. In the latter year he was elected to the United States senate, where he served with marked success for twelve years. In 1879 he became secretary of war under President Hayes, and was a member of the Utah Commission in 1882. He died April 22, 1903.

RAMSEY, David, patriot and historian, born in Lancaster county, Pennsylvania, April 2, 1749; died May 8, 1815. He graduated from Princeton College, took a course in medicine, and established a successful practice at Charleston, South Carolina. From 1776 to 1783 he was a member of the South Carolina legislature, and entered congress in the latter year, where he served till 1786. Ramsey was an eminent advocate of American independence, and was held as a hostage by the British at St. Augustine for eleven months. His principal writings include "History of the American Revolution;" "Life of Washington," and "History of South Carolina."

RANCH, a term applied in the western states to an establishment for rearing and grazing cattle and other stock in large num-

bers. The name was derived from the Spanish word rancho, meaning a hut or collection of huts in which ranchmen mess and lodge. Ranching has long been an important business, and involves the rearing of large herds of cattle, horses, ponies, and sheep. For nearly half a century the ranchmen and cowboys had almost uninterrupted possession of many sections of the great plains, but the region is now penetrated more or less by railroads and limited by agriculturists.

RANDALL (răn'dạl), **Samuel Jackson**, statesman, born in Philadelphia, Penn., Oct. 10, 1828; died in Washington, D. C., April 12, 1890. He first engaged in a mercantile business in Philadelphia, became state senator in 1858, and served two years in the Union army, attaining to the rank of captain. In 1862 he was elected to congress as a democrat, but served again in the army in the Gettysburg campaign. His congressional service included a period of twenty-seven years, and he was speaker of the house from 1876 to 1881. Randall was prominent as a leader of the protectionist wing of the democratic party, opposed the Force Bill in 1875, and served on a number of important committees. He was held in high esteem by his constituents and congressmen for his eminent ability and devotion to legislative duties.

RANDOLPH (răn'dŏlf), **Edmund Jennings**, patriot and statesman, born in Williamsburg, Virginia, Aug. 10, 1753; died in Frederick county, Virginia, Sept. 12, 1813. He was the son of John Randolph, a royalist, who disinherited him because he sided with the Americans and joined Washington's army. After taking a law course, he was admitted to the Virginia bar. He was a member of the Virginia constitutional convention in 1776, and in the same year succeeded his father as attorney-general. He was a delegate to congress in 1781-82, governor of Virginia in 1786-88, and in 1789 became attorney-general of the United States. President Washington appointed him secretary of state in 1794 to succeed Jefferson, but he resigned the following year on account of a misunderstanding in relation to the Jay treaty. Subsequently he practiced law in Richmond, Virginia, and served as a counsel on the trial of Aaron Burr for treason. He published a history of Virginia.

RANDOLPH, John, statesman, born in Cawsons, Virginia, June 2, 1773; died in Philadelphia, June 24, 1833. He descended from a wealthy family of Virginia, was a second cousin of Edmund J. Randolph, and traced his ancestry to Pocahontas, the famous Indian princess. His education was secured at Princeton and Columbia colleges. He was elected to congress as a democrat in 1799, of which body he remained a member, with the exception of two terms, till 1825, and served as United States senator for two years, from 1825 to 1827. Randolph was a strict constructionist, and was renowned for eloquent satire. His influence as a speaker was enhanced by his wit and eccentricity. He opposed Madison and the War of 1812, and was led into a duel with Clay by styling the union of Adams and Clay a "coalition between the black-leg and the Puritan." His opposition to the War of 1812 caused his defeat for congress. Randolph attracted more attention than any statesman of his time on account of his decided views in favor of state rights, opposition to alleged usurpation of power at Washington, and the readiness and effect of his oratory. President Jackson appointed him minister to Russia in 1830, and he was elected to congress in 1832, but died of consumption before taking his seat. Randolph provided in his lifetime for the liberation of his slaves, about 300.

RANDOLPH, Peyton, statesman, born in Williamsburg, Virginia, in 1723; died in Philadelphia, Penn., Oct. 22, 1775. He graduated from William and Mary College, studied law in London, and in 1748 was given an appointment by the king as attorney-general of Virginia. In 1765 he prepared the remonstrance passed by the house of burgesses against the passage of the Stamp Act, and soon after became a member of the house of burgesses of which he was chosen speaker. He was president of the first continental congress that assembled in Philadelphia on Sept. 5, 1774, and also when that body reassembled on May 10, 1775, but died of apoplexy the following October.

RANGOON, the capital and chief seaport of British Burmah, on the Rangoon River, twenty miles from the sea. The Rangoon River is the eastern branch of the Irrawaddy, and the city is situated along the left bank, its dock being on the opposite side of the river, at the suburb of Da-la. Rangoon is an important railroad and trade center. It is fortified and garrisoned, and contains many valuable public buildings. The most noteworthy structures include the government buildings, St. John's College, a number of excellent hospitals and schools, and numerous churches, mosques, and temples. A large majority of the people are Burmese, but it has a considerable number of Hindus inhabitants. A city has existed there since many centuries before the Christian era, but its prosperity dates from the 18th century, when it was taken and rebuilt by the Burmese. The British came in possession of it in 1852. It is the seat of rice mills, and there are manufactures of clothing, lumber products, pottery, and utensils. The trade in timber, ivory, rice, hides, cotton, precious stones, and gums is important. Population, 182,545.

RANJIT SINGH, noted military leader of the Punjab in India, born Nov. 2, 1780; died June 27, 1839. He was the son of a Singh chief, who died in 1786, and the son received an adequate training in military

tactics. His capacity as a military and political ruler induced the shah of Afghanistan to intrust him with the government of the province of Lahore. It soon became his ambition to unite all the Singh provinces into one dominion, which he did after a decade of earnest and enduring perseverance, thus founding the Singh kingdom. His army of 75,000 men was defeated by the Afghans in 1836, but he still continued absolute sovereign over the territory he had acquired. His reign was one of moderation, and stands as a signal success in Asiatic history, being particularly remarkable for the reason that he lacked even the elements of an education.

RANKE (rän'keh), **Leopold von**, eminent historian, born in Wiehe, Germany, Dec. 21, 1795; died in Berlin, Sept. 23, 1886. He studied at Halle, Berlin, and Leipsic, and in 1818 became a tutor in the Frankfort gymnasium. In 1825 he was appointed professor of history in the University of Berlin, a position given him because of his first great historical work, the "History of Latin and Teutonic Nations." Ranke continued to lecture at Berlin until his death. His life was one of remarkable activity, producing not only a large number of works, but many historical productions of value and wide popularity. His "Prussian History" is a work of twelve volumes that appeared in 1847, and his "History of the Popes of Rome," a voluminous work, has been translated into the language of nearly every civilized people. His last great work is his "History of the World," in twelve volumes, which he completed at the age of eighty years. Ranke was highly honored by the government. He was granted a title of nobility in 1865, became privy councilor in 1882, and his ninetieth birthday, in 1885, was made a national holiday, on which Emperor William called at his residence and personally congratulated him. His works show much care in treating doubtful and obscure points of history, and bear the marks of excellent judgment and a marvelous memory. Among his writings not mentioned above are "History of Germany in the Time of the Reformation;" "Princes and People of Southern Europe in the Sixteenth and Seventeenth Centuries;" "Servian Revolution;" "History of France in the Sixteenth and Seventeenth Centuries;" "History of England in the Seventeenth Century," and "History of Wallenstein."

RANUNCULUS (rȧ-nŭn'kū-lŭs), a genus of herbaceous plants of the buttercup family, several common species of which are known as buttercup or crowfoot. The flowers have five or more petals and numerous stamens, and the seeds are grouped into a head or cluster. The leaves of most varieties are much divided, the roots bulbous, and some species have acrid and caustic properties. Buttercups are among the more common varieties and are found largely in meadows, while crowfoots and spearworts are equally well known, the former growing mostly in pastures and the latter in marshes and wet places. More than a hundred species have been described. A double-flowered variety, known as bachelor's button, is cultivated in some regions as a flowering plant. It has a tall stem and white or yellow flowers.

BACHELOR'S BUTTON.

RAPHAEL (răf'a-el), or **Raffaello, Sanzio**, one of the most eminent painters of the world, born in Urbino, Italy, April 6, 1483; died at Rome, April 6, 1520. He was the son of Giovanni Sanzio, a painter, who died in 1494. From him the son received his first instruction, but he was afterward intrusted to the care of an uncle, who placed him in the studio of Perugino at Perugia. He was instructed under this eminent painter for a term of six or eight years. He went to Florence in 1504, where he painted till 1508, and then was invited to Rome by Pope Julius II. His paintings were at first influenced to some extent by the manner of Perugino, but at Florence he began to develop a new and independent style of artistic work by studying the productions of the great masters. It may be said that he acquired simplicity and strength of outline from Michael Angelo, a depth of coloring from Fra Bartolemmeo, and grace of expression from Leonardo da Vinci. His Florentine productions include "Christ Bearing the Cross;" "Madonna;" "Holy Family," and "Marriage of Joseph and the Virgin." After reaching Rome, he was engaged to assist Bramante in embellishing the Vatican, in which he executed many famous frescoes. These include "Dispute of the Fathers of the Church" and "School of Athens," both in the second chamber. Other frescoes in the Vatican are the "Fall of Adam;" "Solomon's Judgment;" "Temperance;" "Astronomy;" "Emperor Justinian Delivering the Roman Law to Tribonian;" "Gregory X. Giving the Decretals to an Advocate;" "Leo the Great Stopping the Progress of Attila;" "Moses Viewing the Burning Bush;" "Deliverance of Peter from Prison;" "Building of the Ark," and "Jacob's Dream." Raphael's works are generally grouped in three classes, including those executed in the manner influenced by Perugino, those produced under his Florentine style from 1504 to 1508, and those executed after settling in Rome. Transition to the latter style is first

recognized in his "Dispute of the Fathers of the Church." Though each style has its peculiar merit, it may be said that his last manner exhibits the most classical features, since it was influenced largely by his contact with numerous productions of the classical period. The last famous work undertaken by him is his "Transfiguration of Christ," which was left in an unfinished state at his death, and may be seen in the Vatican.

RAPPAHANNOCK (răp-pa-hăn'o̊k), a river in Virginia, which has its source in the Blue Ridge Mountains, and after a course of 225 miles toward the southeast, flows into Chesapeake Bay by an estuary about seventy miles long. It is navigable to Fredericksburg, 110 miles. Its principal tributary is the Rapidan. On these two rivers occurred the important battles of Fredericksburg, Chancellorsville, and the Wilderness, in the Civil War.

RARITAN (râr'ĭt-ån), a river of New Jersey, which rises in Morris county and flows southeast into Raritan Bay. It is seventy miles long and is navigable to New Brunswick. The Delaware and Raritan Canal joins it at that city, connecting it with the Delaware River and forming a short route between New York and Philadelphia.

RASK (räsk), **Rasmaus Christian**, noted philologist, born near Odense, Denmark, Nov. 22, 1787; died Nov. 14, 1832. He studied at the University of Copenhagen, and later made an extended visit to northern Russia, Sweden, and Iceland with the view of making a study of the Scandinavian languages. In 1818 he published "Researches Concerning the Origin of the Icelandic or Ancient Language of the North." Shortly after he secured government aid to travel through Russia, Persia, Arabia, and India, and spent some time studying Sanskrit in the last named country. He visited Astrakhan to study the language of the Tartars, and made his return journey through Turkey, reaching Copenhagen in 1823. Two years later he became professor of literary history in the University of Copenhagen, and was made teacher of Oriental languages in 1828. His death resulted from his energies becoming exhausted by hard work. Rask is the author of several grammars and numerous works on history and philology, among them "Ancient Egyptian Chronology;" "Anglo-Saxon Grammar," and "Oldest Hebrew Chronology."

RASPBERRY (răz'bĕr-rỹ), a shrubby plant belonging to the same genus as the blackberry. It is cultivated extensively as a garden fruit. The old plants have many suckers; the stem is characterized by slender prickles, and the leaves are pinnate. It is native to America and northern Eurasia. The cultivated varieties have been greatly improved, and about 500 different kinds have been described. There are red, yellow, and black species, and the fruit resembles the strawberry in not becoming acid in the stomach. Its ripened fruit is used in making jam, jelly, and various liquors, and is eaten as a dessert. Different kinds of medical preparations are made of it, including

RASPBERRY.

compounds of use in fevers and for expectorants. In many sections of the United States are wild species, and the cultivated varieties are grown as far north as Canada.

RAT, a class of rodent mammals belonging to the mouse family, but including only the larger species. A number of species have been described. They infest houses, barns, and ships. Most rats have a slender head and a long, scaly tail. The Norway or brown rat is about nine inches in length, and is the largest and most powerful. The black rat has a somewhat shorter body, a longer tail, and larger ears. These two kinds are native to Central Asia, where other allied species also prevail. Rats were unknown in Europe until the 16th century, when the black rat made its appearance, and about two centuries later the brown rat

COMMON RATS.

became common to the western part of that grand division. Both are now distributed in America and are hostile to each other. The brown rat being the stronger, it either kills

or drives the black rat from a locality when it once gets a permanent foothold. Rats feed on many kinds of animal and vegetable food, and to obtain it they burrow in the ground or gnaw through wooden structures. They devour eggs, small poultry, birds, grain, and vegetables, and make their way into warehouses and dairies. The rat multiplies very rapidly. Its flesh is eaten only by rude tribes and animals, though its skin is used to a considerable extent in making gloves. The white rat belongs to this class of animals, and is frequently seen as a household pet. A species known as the cotton rat is common to the southern part of the United States.

RATISBON (răt'ĭz-bŏn). See **Regensburg**.

RATON, a city of New Mexico, in Colfax county, about 115 miles northeast of Santa Fe. It is surrounded by a mining and stock-raising country, and has good railroad facilities. Electric lights, telephones, waterworks, and several fine schools are among the improvements. It has a growing trade in merchandise. Population, 1900, 3,540.

RATTAN (răt-tăn'), the name applied commercially to the long and flexible stems of several species of climbing palms, and to the more rigid stem of certain erect palms. The former are very tough and strong, and are used for many purposes, such as making ropes, seats of chairs, cables, baskets, mats, hats, and various kinds of wickerwork. The stems of the erect palms are used mostly for walking-sticks. Rattan is produced largely in Sumatra, Java, and other islands southeast of Asia. It is sold in the export market in bundles of one hundred canes, each measuring from fifteen to twenty feet in length.

RATTLESNAKE, the general name of several species of venomous snakes, so named because of having a series of horny

RATTLESNAKE.

scales at the end of the tail, which clash together with a rattling sound when the tail is vibrated. The rattle is a complicated organ, and appears in very young rattlesnakes, before they have shed their skin for the first time. When the skin is renewed a new joint appears next to the body of the snake, while the old one is not cast off with the remainder of the epidermis. Thus there are as many loose joints in the rattle as there have been renewals of the skin of the snake, though the number does not indicate the age of the snake, since the skin is changed oftener than once a year, but it does indicate the number of changes of skin that the animal has undergone. The rattles are dry, horny, and cup-shaped, each fitting over a portion of the preceding, and tapering toward the farther end. They give off a peculiar sound when shaken, unless wet by rain or dew, when no sound can be produced. Rattlesnakes are native to America, and include about fifteen species. They are sluggish in habit, but pursue squirrels, rabbits, mice, and other animals upon which they prey, with considerable skill. The poison is one of the most deadly found in serpents, and penetrates rapidly and with deadly effect the nervous centers. The prairie rattlesnake attains a length of about three feet, and is found in many sections of the western states, where it shares burrows in common with prairie dogs and owls. The banded rattlesnake occurs east of the Mississippi, and reaches a length of from four to six feet. Other and larger species are found in Mexico, Central America, and South America.

RAUHES HAUS, meaning rough house, an institution founded near Hamburg, Germany, by Johann Heinrich Wichern. It is located at a suburb named Horn, and is managed as an adjunct to the German Home Mission. This institution was opened in 1831, and has since grown into an important institution for the culture of children—physically, intellectually, and morally. An artisan is appointed for the supervision of families of children, usually about twelve, and they are instructed in different elementary branches of study and are trained to do all classes of useful household and outdoor labor. The institution somewhat resembles an industrial school, with the addition of special efforts to inculcate moral tendencies and ability for various occupations, such as teaching, superintendence, clerking, etc.

RAUCH (rowk), **Christian Daniel**, distinguished sculptor, born at Arolsen, Germany, Jan. 2, 1777; died at Dresden, Dec. 3, 1857. He studied sculpture at an early age, but at the death of his father, in 1797, went to Berlin. While there he became valet to Frederick William III., who recommended him to the Academy of Fine Arts. In 1804 he visited Rome, where he became acquainted with Thorwaldsen and Canova, and received patronage from William Humboldt, then Prussian minister at Rome. The king of Prussia called him to Berlin in 1811 to execute a monumental statue of Queen Louisa, a work which established his fame. This production is now in the garden of

Charlottenburg, at the mausoleum of the queen, and a second statue of the queen by him is in the palace of San Souci, near Potsdam. The latter work occupied his time for eleven years, and is regarded among the famous masterpieces of sculpture. Other noted productions include statues of Schiller, Goethe, Schleiermacher, Dürer, Maximilian of Bavaria, and Field Marshal Blücher. The magnificent monument of Frederick the Great in Berlin is his greatest work, which was completed after twenty years of labor, and was dedicated with great pomp in 1851. Rauch was a tireless laborer, and is the designer and executor of many ideal busts in marble, several of which are of colossal size.

RAVEN, a species of crow, widely distributed, and remarkable for its large size. It is about two feet from the bill to the tail,

RAVEN.

and its extended wings measure nearly three feet. The plumage is glossy black. Its bill is thick and short, the tail is rounded, and its flight extends high into the air. Ravens are able to scent carrion a distance of several miles, which causes them to congregate in the vicinity of dead animals, their favorite food, but they also feed on fruits and tender shoots of plants. They are noted for being long-lived, and may be taught to imitate human speech. The ravens are noted in literature, being the first birds to be mentioned in the Old Testament, and they are alluded to in classic mythology as an ill-omen. Shakespeare mentions the appearance of the raven as foreboding misfortune, while Poe makes it a prominent figure in "The Raven."

RAVENNA (ra-vĕn'a), an important city of Italy, capital of a province of the same name, four miles west of the Adriatic Sea, and forty-two miles southeast of Bologna. It is located in a fertile region, has wide streets, and is surrounded by walls. In former times the sea extended to the city, but now its harbor is silted up, and there is connection by canal with the Adriatic. A railroad line connects it with the great railroad system of northern Italy, giving it convenient trade facilities. Among the manufactures are silk textiles, pottery, utensils, clothing, musical instruments, and machinery. Its streets are adorned with a number of statues of the popes, and the city is generally rich in monuments of art. The principal buildings include a cathedral dating from the 4th century, numerous other churches, and a library containing 100,000 volumes. It has numerous educational institutions, museums, gardens, and parks. Among the municipal facilities are electric lights, waterworks, pavements, and telephones. Ravenna is a very ancient city, and is thought to have been founded by the Umbrians. Emperor Honorius made it the capital of the Roman Empire, but its greatest prosperity was attained under Theodoric the Ostrogoth, who was buried there. It became the metropolis of the Longobardic kingdom in 1752, but the Lombards were expelled by Pepin and Charlemagne, who presented it to the pope. It continued as an exarchate to the pope till 1860. Population, 61,190.

RAWLINS (raw'linz), **John Aaron**, soldier, born in East Galena, Illinois, Feb. 13, 1831; died in Washington, D. C., Sept. 9, 1869. He attended public school and engaged as a charcoal burner, but later studied law. In 1854 he became a member of the Illinois bar, and established a successful practice at Galena. He was elected city attorney in 1857, supported Douglas for the presidency, and opposed armed liberation of the slaves. However, at the beginning of the Civil War he gave hearty support to the administration, and became aide-de-camp to General Grant. He accompanied that military leader in practically all the campaigns and battles from Cairo to Lee's surrender, entering the service with the rank of captain and attaining that of major-general. President Grant selected him as secretary of war in 1869, a position he held until his death.

RAWLINSON (raw'lin-son), **George**, Oriental historian, brother of Sir Henry C. Rawlinson, born at Chadlington, England, Nov. 23, 1815. He graduated from Oxford in 1838, became fellow of Exeter College in 1840, and was made professor of ancient history at Oxford in 1861. In 1872 he became canon of Canterbury, and in 1888 rector of All Hallows, London, publishing in the meantime various works on history. It may be said that his writings are generally conservative. Among the most important are "Five Great Monarchies of the Ancient Eastern World;" "Parthia, Sixth Great Oriental Monarchy;" "Persia, Seventh Great Oriental Monarchy;" "Religions of the Ancient World;" "History of Ancient Egypt;" "History of Phœnicia," and "Kings of Israel and Judah."

RAWLINSON, Sir Henry Creswicke, soldier and diplomat, born in Chadlington,

England, April 11, 1810; died in London, March 5, 1895. He was educated at Ealing, Middlesex, and in 1826 entered the military service in India, serving in the Bombay presidency till 1833. In the latter year he reorganized the Persian army, and served in Afghanistan in 1840-43. He was consul at Bagdad in 1850, and became consul-general for Turkey in 1851. He became director of the East India Company in 1856, and soon after returned to England, whence he was sent in 1859 as special envoy to the shah of Persia. Rawlinson made a special study of cuneiform inscriptions in Persia and other Oriental countries, and in 1871 became president of the Royal Geographical Society. He joined his brother, George Rawlinson, in making a translation of Herodotus, and aided George Smith in publishing "Cuneiform Inscriptions of Western Asia." He sat as a liberal in parliament for a number of years, received a baronetcy in 1891, and contributed a number of articles on geography to magazines and encyclopædias. His principal work is a publication of Eastern political affairs, entitled "England and Russia in the East."

RAY, a genus of cartilaginous fishes. They are generally divided into numerous families, including the saw-fishes, electric

THORNBACK SKATE.

rays, skates, sting-rays, and the eagle rays. The saw-fishes have an elongated body and a peculiar prolongation of the snout, armed with from three to five cartilaginous tubes. This snout prolongation is called the saw, and is a formidable weapon of defense, with which it is able to tear open the body of its prey to feed on the vitals. The electric ray has peculiar organs by which it is capable of generating electricity as a means of defense, or to kill the smaller animals on which it feeds. Its body is smooth and naked. The skates are so named from their peculiar curved spines, while the sting-rays are peculiar for their vertical fins and barbed spine, with which they are able to inflict painful wounds. In the eagle rays the pectoral fins are highly developed, the body is dilated, and the tail very thin. More than a hundred species of rays have been described. Some weigh only a few ounces, while others attain a weight of 1,500 pounds. Various species of the genus are distributed more or less widely in all the seas.

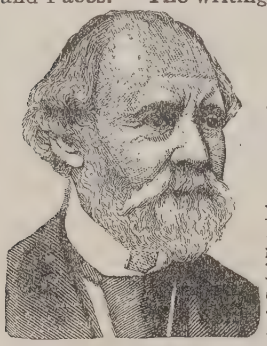
RAYMOND (rā'mond), **Henry Jarvis**, journalist, born in Lima, New York, Jan. 24, 1820; died in New York City, June 18, 1869. In 1840 he graduated from the University of Vermont, and was shortly after selected by Horace Greeley as assistant editor of the "New York Tribune." He became editor of the "Courier and Enquirer" in 1843, and in 1851 founded the "New York Times," one of the leading journals of the United States. He became a member of the New York legislature in 1849, was made speaker in 1850, and became lieutenant-governor of the state in 1854. In 1864 he was elected to congress as a republican, but declined reëlection two years later to devote himself to journalism. His death resulted from an attack of apoplexy. He wrote "Life and Public Services of Abraham Lincoln" and "Life of Daniel Webster."

READ, Opie, author, born in Nashville, Tennessee, Dec. 22, 1852. He was educated at Neophogen College, Gallatin, and after graduating took up journalistic work at Little Rock, where he afterward founded "The Arkansaw Traveler," a weekly publication devoted to literature and humor. Later he removed to Chicago and engaged largely in literary work. Among his best known writings are "Len Gansett;" "A Tennessee Judge;" "A Kentucky Colonel;" "Emmett Bonlore;" "Wives of the Prophet," and "The Jucklins."

READ, Thomas Buchanan, poet and painter, born in Chester county, Pennsylvania, March 12, 1822; died in New York City, May 11, 1872. He studied the elements of sculpture and painting in Cincinnati, Ohio, and spent several years in traveling through various states, supporting himself by sign-painting and occasionally working as a cigar maker. In 1846 he opened an art studio in Philadelphia, but went to Italy in 1850, visiting Florence. Later he established his permanent residence at Rome, though he continued to make occasional visits to the United States. He spent considerable time painting scenes from personal observations in the Civil War, and at that time wrote his best known single poem, entitled "Sheridan's Ride." Other productions include "Female Poets of America;" "House by the Sea," and "Wagoner of the Alleghanies." His principal paintings embrace "Sheridan and His Horse," an illustrative work of the above mentioned poem; "Spirit of the Waterfall," and "Lost Pleiad."

READE (rēd), **Charles**, eminent novelist, born at Ipsden House, in Oxford, England, June 8, 1814; died April 11, 1884. He graduated from Oxford in 1835, studied law, and was called to the bar of Lincoln's Inn in 1843. However, his inclination turned toward literature, but he did not publish any productions until 1850, when his story of "Peg Woffington" appeared. This work was after-

ward dramatized by him in conjunction with Tom Taylor, and became known as "Masks and Faces." The writings of Reade are full of energy and bear marks of strong moral purpose, though in some the style is rugged and often crude. It was his purpose to recount many of the abuses in the prison system of England, the mismanagement of its hospitals, and the oppression practiced by trades-unions. Incidents in relation to these matters were interwoven with imaginary narratives, and the whole was given a dramatic form easily adaptable to the uses of the stage. Among his best known works are "It Is Never Too Late to Mend;" "Griffith Gaunt;" "Terrible Temptation;" "Course of Love;" "Christie Johnstone," and "Cloister and the Hearth."



CHARLES READE.

READING, the art of perusing written or printed matter to ascertain and consider its contents or meaning. The subject as a whole is divided into oral and silent reading. Oral reading is closely associated with elocution, as it involves giving proper oral expression to thought and sentiment, though the latter term has particular reference to the higher department of reading. Silent reading is the act or practice of reading to one's self, or the art of perusing written or printed matter without uttering aloud the words. It is merely seeing the thoughts through the words. Skill in both oral and silent reading is made an objective point in studying the subject, but it may be said that silent reading is the more important of the two, since the larger part of our study is from printed pages with the view of getting thought and meaning. However, oral reading is a fine art, and skill in it should be regarded a valuable accomplishment. Many of the noted actors and public readers have been as highly honored as the eminent musicians; it is difficult to say whether the higher praise is due to Charlotte Saunders Cushman (q. v.) or Jenny Lind.

While the subject of reading is of interest to all, it has special elements of importance to teachers of children and youth. A comparatively small proportion of teachers in the common schools have been as well equipped to teach reading as its importance demands, but there is a notable improvement in ability to instruct as well as in the methods employed, especially in the states where an adequate number of normal schools and institutes have been provided for the equipment of teachers. The lack of thoroughness in reading may be attributed at least partially to the circumstance that many educators have looked upon it as secondary to grammar, mathematics, and other sciences. However, it is to be noted that many academies and schools of higher learning are employing special teachers of reading and elocution. On the other hand, public schools are becoming equipped with professionally trained teachers in the primary branches, who are cultivating a taste for reading, and laying a foundation for wholesome advancement in both thought-gathering and expression.

Much has been said and written on the art of teaching reading. Many plans of instruction have been proposed, among them the so-called alphabet, word, object, phonetic, synthetic, and sentence methods. The alphabet method was formerly in general use. By it the pupil is taught the letters of the alphabet before an effort is made to teach reading. It differs from the word method, in that by the latter children are taught to recognize words as wholes rather than to learn them by noticing the individual letters of which they are composed. The object method is quite similar in many respects to the word method, but differs from it in that the attention of the learner is directed to objects instead of names. Usually pictures as well as objects are used in conversational lessons. Both the phonetic and synthetic methods consist chiefly in teaching the elementary sounds of the language, but in the latter greater stress is laid upon the importance of articulating the particular sounds and using them in building words. This is done by the learner uttering them as distinct sounds, by repeating in concert, and by singing them according to a scale or in verse. In the sentence method the beginner is taught sentences rather than letters or words. It is based upon the theory that the sentence is the unit of language, and that we think in sentences.

While all the methods of teaching reading possess merit, it may be said that there is no arbitrary plan by which reading can be taught successfully to all students. The most feasible way is to become acquainted with all the methods, and use them in combination as the particular needs of the pupil or classes may require. Much depends upon the ability and tact of the teacher. However, it should be aimed to lay a basis for advanced reading, whereby the mind may be trained to become active and scrutinizing. In all grades of teaching the instructor needs to keep in mind the mental, vocal, and physical elements. The mental element is that by which we understand and feel what we read, and embraces the intellectual and emotional powers. The vocal element pertains to the voice, and is concerned with pronunciation and modulation. Pronunciation is the art of uttering words correctly. It includes articulation and accent. Modulation is the variation of

voice in speaking and reading. The physical element in reading is concerned with the body, and embraces breathing, facial expression, posture, and gesture. In reading much depends upon example and imitation. Hence, the teacher should be a good reader in order to obtain wholesome results. He needs to inculcate the power of thought-getting, and the ability to convey meaning when reading. The habit of accurate reading, once acquired, is a source of much profit. It makes a good book a useful companion.

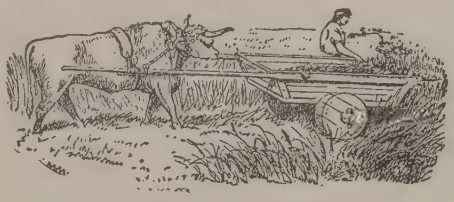
READING (rēd'ing), a city of Pennsylvania, in Berks county, on the Schuylkill River, fifty-eight miles northwest of Philadelphia. It is an important railroad and trade center, and has an extensive system of electric lights and street railways. Its improvements include a water plant, steam-heating plants, a beautiful park, and numerous public schools. The manufactories employ 15,000 persons, and produce annually merchandise valued at $25,000,000. Among the leading products are ironware, steam boilers, cotton and woolen goods, paper, tobacco products, pottery, leather, and machinery. It has extensive railroad machine shops. Among the principal buildings are a fine courthouse, the Lutheran Trinity Church, Mishler Academy of Music, and many fine churches. A large per cent. of the people are of German descent, and there are a number of periodicals and schools conducted in that language. The city is surrounded by a fertile country producing cereals, fruits, and dairy products. It has deposits of anthracite coal and iron ore. Population, 1900, 78,961.

READING, a city of England, in Berkshire, thirty-five miles southwest of London. It is at the junction of several railways, and it has additional trade advantages because of being near the junction of the Kenneth and Thames rivers. Among its noted buildings are the Benedictine Abbey, founded in 1120, and the Church of St. Lawrence, a structure of the Norman type. It is the seat of several hospitals and educational institutions. The surrounding country is fertile. Among the manufactures are silk goods, machinery, spirituous liquors, flour, and earthenware. Population, 61,048.

REALISM (rē'al-iz'm). See Idealism.

REAL SCHOOLS, in German Realschulen, a class of educational institutions maintained in Germany. They take a place immediately between the elementary school and the university. There are two classes of real schools, the higher preparing for certain courses in a university, and the lower fitting for professions that require no university education. The higher grade is the real-gymasium, as opposed to the gymnasium proper, or classical school.

REAPING, the act of cutting down and gathering grain, as in harvesting wheat, oats, or corn. Reaping is as old as human history, though the instruments used in early times were greatly different from those now employed. The oldest known device for cutting the grain is a reaping-hook or sickle. It was employed by the ancient Jews and Egyptians, and continued in use by the civilized nations down to the latter part of the 19th century. The sickle consists of a curved instrument about two



ANCIENT REAPING MACHINE.

feet in length, having a wooden handle, and tapering from a width of about two inches near the handle to a point at the opposite end. The edge is sometimes serrated, but generally it is plain and sharp like a knife. It is held in the right hand by the harvester, who cuts the standing grain near the surface, holding a handful of it by the left hand. The first few handfuls of grain are made into a band, which is laid on the ground, and when a sufficient amount of grain has been cut and laid on the band, it is bound around it to form the sheaf. After a number of sheaves, usually twelve, have been bound in this way, they are set up to form the shock, in which position the grain is left on the field until sufficiently cured, when it is placed in the stack or barn-mow to be threshed.

The process of reaping described here is one that the writer personally witnessed in the harvest fields both of Australia and America, but it has now given way to harvesting by machinery, in which the same work is done by mechanical devices that quite successfully take the place of the human hand. However, improvement in this line was brought about by a long period of evolution, the ordinary scythe following the sickle, that in turn giving way to the

MODERN REAPING MACHINE.

cradle, until finally the machines were produced that are drawn by animal or steam power. The ancient methods of reaping are still used to some extent by primitive peo-

ples, and in some sections of Asia and Spanish America. In some countries, as in ancient times, the harvester cuts the grain by hand and places it in a wooden cart moved by an ox or some other animal. This method is advantageous where the grain is quite ripe and dry, thus insuring it against molding or decay, and it is usually customary in such cases to cut little more than the heads, the remaining portions of the standing grain being either plowed under or used for pasture. See **Harvesting Machinery.**

REASON, the mental faculty by which man is able to distinguish truth from error, and which places him in the scale of life far above the lower animals. It comprises conception, judgment, reasoning, and the intuitional faculty, and in the philosophy of some writers there is a shade of identity between reason and understanding. Reason can exercise itself on the most abstract and spiritual theories; as well as on those of a simpler character. It was formerly believed that of all visible creatures man alone possesses reason, but most writers within the last century expressed views favorable to the theory that animals possess some power of reason, a position now generally accepted. It may be that their actions are due to the association of ideas or to instinct, but the former principle is associated with reason.

REAUMUR (rā-ō-mür'), **Rene Antoine Ferchault de**, naturalist and physicist, born in La Rochelle, France, Feb. 28, 1683; died Oct. 17, 1757. He was the son of a French nobleman, was educated in his native city, and made a specialty of studying mathematics, natural history, and physics. In 1703 he removed to Paris, where he published several treatises on geometrical problems, and in 1708 became a member of the Academy of Science. Among his discoveries in natural history are several in connection with the fossil remains found in the rivers and mines of France, his researches leading to a collection of fossil remains of extinct animals. In 1725 he published details of the mode of producing steel from iron, and described the method of tinning iron. In 1731 he invented the thermometer that bears his name, and in 1739 experimented in making pottery. Reaumur discovered a process of making porcelain quite equal to that manufactured in Saxony and Japan. His papers and published works treat of numerous phases and branches of science, the most important being his "History of Insects," a work in twelve volumes.

RECAMIER (rā-kä-me-ā'), **Madame**, noted woman of society, born in Lyons, France, Dec. 4, 1777; died May 11, 1849. Her maiden name was Jeanne Bernard. She was the daughter of a wealthy banker, and possessed remarkable grace and rare beauty. After attending the convent of La Deserte, where she was trained under the care of an aunt, she was taken by her parents to Paris, and in 1793 married M. Jacques Récamier. He was nearly thrice her age, a man of wealth, and she became enabled to mingle in the society of Paris with a brilliancy and triumph almost without a parallel in Europe. As she was fond of literature, she filled her salon with the finest productions, and made her home the gathering place of the most fashionable and influential literary and political society. Her influence in social and political affairs was remarkable, and she was frequently spoken of as the unacknowledged legislator, since numerous legislative acts were attributed more or less directly to the influence she exercised over a large number of prominent individuals. The fortune of her husband was entirely spent, and in 1806 she visited Madame de Stael at Coppet, Switzerland, where the latter had gone after being banished by Napoleon. Her husband died in 1845, and though she had a number of proposals to marry again, among them one from Prince August of Prussia, she remained unmarried. She made a reputation as one of the most noted society queens of France.

RECIFE (rā-sē'fā). See **Pernambuco.**

RECIPROCITY (rĕs-ĭ-prŏs'ĭ-tў), a term used in economics, which is commonly applied to legislation intended to foster foreign commerce. It generally implies trade relations, mutually advantageous to the same extent, between two or more nations. Countries establishing reciprocal trade relations either admit each other's products free of duty or charge an equivalent tariff. A reciprocity treaty was established between the United States and Canada in 1854, but it was terminated in 1866. A similar treaty was made between the United States and Hawaii in 1876. James G. Blaine was instrumental in calling general attention to the system of reciprocity, and through him it was made prominent at the Pan-American congress that assembled at Washington in 1889. The result was that the president of the United States was authorized by an act of the American congress to negotiate reciprocity arrangements as to certain commodities. President Roosevelt in his official capacity, especially in the message to congress in 1901, gave hearty support to the doctrine with the view of extending our foreign commerce.

RECONSTRUCTION (rē-kŏn-strŭk'-shŭn) the term applied to the process of bringing back to the Union the states that seceded previous to or at the beginning of the Civil War. The Confederate States passed under the military control of the United States when the Confederate army surrendered in 1865, but they were regarded as conquered territories, and not as members of the Union. President Johnson held that these states maintained the same constitutional relation to the United States government as before their secession, and accordingly appointed provisional governors.

These governors invited the people to send delegates to conventions with a view of forming constitutions for the respective states. However, congress upheld the view that these states could be readmitted only on such terms as that body would impose. This view was maintained principally because it was thought that the freedmen would not secure proper recognition of their civil and political rights if the matter of reconstruction were left entirely to southern people, many of whom expressed views in opposition to general enfranchisement.

President Johnson had recognized provisional governments in all the southern states before congress met in December, 1865, on their accepting the thirteenth amendment to the constitution. Congress proposed the fourteenth amendment to the constitution, and in 1867 passed the Reconstruction Act, by which five military districts were established in the south. It was the purpose to effect a registration of voters, including Negroes, and these voters were to elect representatives to a convention, which should make a constitution and submit it to be ratified by the people. It was next to be submitted to congress for approval, and whenever the fourteenth amendment was ratified by the legislature, the states ratifying should be reinstated. From this act resulted the carpet-bag government, so called because many designing individuals from the north went south to fill offices at favorable remuneration. Tennessee ratified the fourteenth amendment and was readmitted in 1866, hence was not materially affected, but Alabama, Arkansas, Florida, Louisiana, and the Carolinas were readmitted under this special act. It was also required that the amendment be ratified by Georgia, Mississippi, Tennessee, and Virginia, which states were readmitted in 1870.

RED-BREAST. See Robin.

RED CROSS SOCIETY, an international society for the relief of the sick and wounded in the time of war, and now recognized as an important factor in military sanitation. It may be said to have originated from the recommendations made by Henri Dunant, a Swiss gentleman, who in 1859 served on the medical force in the Italian wars. At the close of the war he published a work calling attention to the needless hardships endured by the sick and wounded. He recommended that a universal society for the care of disabled soldiers be organized, and that the sick and wounded be regarded as neutrals in war time. Soon after he secured aid and coöperation from the Swiss federal council in calling an international conference, which met in Geneva, Oct. 26, 1863, and in it were represented sixteen nations, but since then the number of powers signing the conditions required has grown to forty-five.

The principal conditions to be complied with by each nation joining the association is the provision that a society is to be maintained by each power, which is to care for the sick and wounded in war-time, and to devote attention to the training of nurses and preparation of hospital stores in time of peace. Provisions were made whereby the general society is bound to coöperate by sending representatives and nurses to any country where war, famine, pestilence, floods, or any other great calamity may exist, though the Geneva treaty extends protection only in war-time. The first provisions for supplying aid in naval warfare were adopted at Paris in 1868, and later other features were added at an international conference held at Berlin. The badge of the society is a red cross on a white background, and it must be accompanied in time of service by the banner of the country in which the society operates. The American society was formed under the direction of Clara Barton, who is the originator of the plans for extending relief on a broader basis than only in war-time. Among the notable instances of recent times in which the Red Cross Society has extended valuable relief are the period of Turkish atrocities in Armenia, the Spanish-American War, the Anglo-Boer War, and the Filipino insurrections.

RED JACKET, an Indian chief of the Senecas, born near Lake Seneca, New York, in 1752; died on the Seneca reservation near Buffalo, Jan. 30, 1830. His Indian name was Sa-go-ye-wat-ha, meaning "He keeps them awake," but he was named Red Jacket from a scarlet jacket presented to him early in the Revolution by a British officer. He fought with the Six Nations against the colonists during the Revolution, but helped the Americans against Tecumseh in 1809-10, and fought against the British in the War of 1812. He lost his position as chief for a time after retiring to the reservation on account of intemperate habits, but was afterward reinstated. Red Jacket was sagacious as a statesman and eloquent as an orator, but persistently opposed the establishment of Christian missions and schools.

RED RIVER, an important western tributary of the Mississippi, the most southerly affluent of that river. It rises in the Staked Plain in Texas, near the boundary of New Mexico. Near its headwater it passes through a magnificent cañon one hundred miles long, which in some places is fully 1,000 feet deep. Its general course is toward the southeast, forming the principal part of the northern boundary of Texas, and after passing through Arkansas and Louisiana, it enters the Mississippi about 300 miles from the Gulf. In its lower course are numerous lakes and bayous, all of which abound in fish. It receives the water from the Negro, Washita, and Little Washita rivers. Owing to its winding course, the Red River has a length of 1,550 miles, of which

about 1,200 miles are navigable. It was so named from the color of the sediments carried by it in a period of high water.

RED RIVER OF THE NORTH, a river of the United States and Canada, forming the principal part of the boundary between Minnesota and North Dakota. The Otter Tail rises in the lake region of western Minnesota, near the source of the Mississippi, and has a general course toward the southwest until it makes a bold curve near the border of the state and then joins the Bois de Sioux to form the Red River of the North, which flows nearly due north into Lake Winnipeg. Among its numerous tributaries in the United States are the Goose, Sheyenne, Wild Rice, Marsh, and Red Lake rivers. Its total length is 660 miles, of which 520 miles are in the United States. The Assiniboin joins it in Manitoba, at the city of Winnipeg. The earl of Selkirk made the famous Red River settlement, on the banks of the Red River of the North, in 1812. It was founded on a tract of land obtained from the Hudson Bay Company, which was afterward conveyed back to that company, and in 1870 transferred to Canada. It is now a part of the province of Manitoba.

RED SEA, or Arabian Gulf, an inlet from the Indian Ocean, lying between Africa and Arabia. It communicates with the Gulf of Aden by the Strait of Bab-el-Mandeb, and stretches in a narrow expanse of water toward the northwest to the Isthmus of Suez, which separates it from the Mediterranean. Its length is 1,450 miles, and its width in the central part is about 200 miles, whence it gradually diminishes toward the extremities, being about twenty miles wide near the Strait of Bab-el-Mandeb. It is divided in the upper part by the Sinai peninsula, thus forming the two gulfs of Suez and Akabah. The former is the larger of the two, being 180 miles long and twenty-five miles wide, while the latter is one hundred miles long and about twelves miles wide. The Red Sea has been an important seat of commerce from remote antiquity, and was navigated by the ancient Egyptians, Phœnicians, Arabs, Hebrews, and Persians.

Navigation of the Red Sea is more or less dangerous, owing to the prevalence of violent winds and the numerous shoals, islands, and coral reefs that abound along the shores. Coral reefs are particularly abundant near the Arabian coast, where they are remarkable for their scarlet tints mingled with white. A strong current of wind blows from the south from October to May, and from the north from May to October. This results in a current of water passing through the Strait of Bab-el-Mandeb in the former season, which raises the sea-level several feet, but it is correspondingly lowered in the period in which the wind blows from the north. Much of the trade from southern Asia passed up the Red Sea and was conveyed by caravans to the Mediterranean until the route around the Cape of Good Hope was discovered, when it was turned largely in that direction, but in 1870 the Suez Canal was opened to trade, which immediately reëstablished the Red Sea as an important highway between the east and the west of Eurasia. There is a considerable trade across the sea, but this consists chiefly of slaves and the traffic in connection with pilgrims to Mecca. Jedda, Hodeida, and Mocha are the principal seaports on the Arabian coast, and Kosseir, Massowa, Suez, and Suakin on the African coast.

REDSTART, a genus of American birds, which are native to a region extending from Canada to Bolivia. About a dozen species

REDSTART.

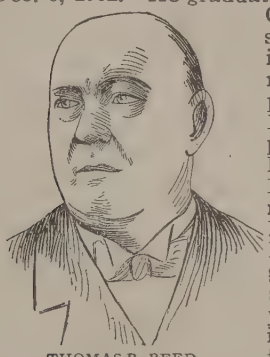
have been described. They are very active, being skilled in catching flies and other insects while on the wing. The male of most species has a glossy black color, with spots of white and orange-red on the wings and tail, and the female is brownish. The redstart of Eurasia and Africa is somewhat larger and resembles the redbreast. It has a melodious song and may be domesticated. Redstarts are migratory.

RED WING, a city in Minnesota, county seat of Goodhue county, on the Mississippi River, forty miles southeast of St. Paul. It is important as a railroad and commercial center, has electric lights and street railways, sewerage, waterworks, and excellent public schools. Among the manufactures are boots and shoes, furniture, lumber products, machinery, stoneware, flour, and earthenware. Red Wing is the seat of a Lutheran seminary, a state reform school, and a number of collegiate institutions. The surrounding country is agricultural and dairying. Population, 1900, 7,525.

REED, in music, the mouth-piece of the bassoon, hautboy, clarionet, and several other instruments. Reeds were first made of cane, whence the name has been extended to the reeds of the organ and the harmonium. They are now made of a thin strip of metal. The reed itself does not produce the sound, but is only the means of obtaining the sound from the current of air directed against it. There are two classes of reeds, the striking and free. The former is that commonly used in the pipes of an organ, and the latter in the harmonium. The free reed has a

smoother and more mellow sound than the striking reed, and does not require a pipe, as does the latter.

REED, Thomas Brackett, statesman, born in Portland, Maine, Oct. 18, 1839; died Dec. 6, 1902. He graduated from Bowdoin College in 1860, studied law, and in 1864 entered the navy as assistant paymaster. In 1865 he began the practice of law at Portland, and in 1868 became a member of the Maine legislature. He was attorney-general of the state for two years, city solicitor of Portland for four years, and in 1876 was elected as a republican to congress, where he served continuously until retiring from political life on April 20, 1899. Reed became a leader of his party on the floor of the house soon after entering congress, owing to his efficiency as a speaker and parliamentarian, and served as speaker of the house in the 51st, 54th, and 55th congresses. He was vigorous as a presiding officer, though many public men at first criticized his rulings as arbitrary, but in viewing his positions in the light of history they may be said to have resulted in better and more efficient legislation. His resignation was due to the fact that he regarded it in line with his duty to his family to secure a larger income than is shared by persons holding public office, and he was succeeded as speaker by David B. Henderson of Iowa. It may be said that Reed is considered by all parties one of the most able statesmen of America. He did not favor the so-called expansion policy supported by the administration of William McKinley, sharing in this the view of Benjamin Harrison. He is the author of Reed's "Rules of Parliamentary Law" and contributed many articles to magazines and encyclopædias.



THOMAS B. REED.

REEVES, John Sims, eminent tenor singer, born near London, England, Oct. 21, 1822; died Oct. 25, 1900. His father resided at Shooter's Hill, where the youth received his early training in music, and at fourteen years became organist of North Gray Church. Later he learned to play on various instruments, appearing often as an orchestral leader, and in 1839 sang as a baritone at Newcastle Theater. In 1841 he joined a company at Drury Lane under Macready, but soon after took musical training at Paris and Milan, and in 1847 appeared at Drury Lane, where he attained high distinction. He is noted particularly because of his high quality of oratorio and ballad singing, and long ranked among the first tenor singers. He gave up concert singing in 1891, and the following year was elected professor of the London Guildham School of Music.

REFLECTION (rē-flĕk'shŭn), the power that the mind has to consider and compare sensations and ideas by the aid of the principles of association. It is one of the primary sources of all ideas, the other source being sensation. Some writers, as Herbart, discuss analysis and synthesis as integral parts of reflection. See **Psychology.**

REFORMATION (rĕf-ŏr-mā'shŭn), the great religious revolution of the 16th century, which may be said to mark the end of the Middle Ages and the establishment of Protestantism. Western Europe was under the absolute authority of the Roman popes from the year 800, when Pope Leo III. crowned Charlemagne emperor of the Romans, until restricted by the results following the Reformation. In this period of about 800 years papal authority was supreme over all the Christian Church, except only the countries where the Greek Church had secured a foothold, and this authority was exercised both in spiritual and temporal affairs. Various abuses arose from this widespread power, against which many devoted members of the Roman Church protested, and from which both laymen and clerics sought to secure relief. It may be said that the first organized movement for reform occurred in the early part of the 15th century. It was led by John Huss and Jerome of Prague, in Bohemia, but they and their followers were not able to wield a widespread influence, since conditions had not formed that contained the necessary elements to crown such a movement with success. Among the events that formed and molded public opinion favorable to a great reformation were the invention and general use of printing, the diffusion of knowledge through universities teaching the Greek and Hebrew languages, and advancement in industrial arts and commerce, all tending to lead the people to assert their independence of thought and energy. Besides, the rise of modern literature occasioned by the Renaissance brought forward such writers as Erasmus, who held the abuses of power up before thoughtful men. The last spark needed to kindle a widespread revolution of thought was furnished in the pontificate of Leo X., when Johann Tetzel, a Dominican monk of Leipsic, published indulgences in Germany to procure means for the building of St. Peter's at Rome.

The appearance of Tetzel in Saxony was followed immediately by the pronounced opposition of Martin Luther, an Augustine monk and professor of theology in the University of Wittenberg, who, on Oct. 31, 1517, posted ninety-five theses or questions on the door of the church. His able sermons won many adherents among the influential nobles and princes, who united with

him in urging the pope to suppress the traffic in indulgences and otherwise reform various practices. This brought him into conflict with Pope Leo X., who excommunicated him in 1520, but Luther appealed to a general council. However, his works were burned at Cologne, Mentz, and Louvain, and he retaliated by publicly burning the papal canons and decrees. When Luther formally separated from the Roman Church, he was followed by many German nobles, while most of the eminent scholars, and particularly the University of Wittenberg, declared in favor of the reformed faith. In 1521 he was summoned before the Diet of Worms by Emperor Charles V. of Germany, and his bold refusal to recant not only increased the reform movement, but made it a political matter in the north German states. Soon after the Bible was translated and published in the German language; Luther's "Liturgy" appeared in 1522 and was immediately adopted by Magdeburg and other cities, and translations of the Bible into the Dutch and French languages soon followed. The reformed faith received legal recognition for the first time by the peace of Augsburg in 1555, which gave each prince liberty to adopt either the Protestant or Roman Catholic faith.

Protestantism was carried to Sweden under Gustavus Vasa, who became king in 1523, and it was formally adopted in the Danish dominions at a diet held in 1536. Lutheranism found many adherents in Hungary and Poland, but it was kept out of Italy and Spain by the vigorous application of the Inquisition. Zwingli and Calvin carried Protestantism into Switzerland and various parts of France, while John Knox embraced that faith in 1543 and gave it a firm foothold in Scotland. The first separation from the Roman Church occurred in England under Henry VIII., in 1527-47, but the movement was made more spiritual by improvement in the translations of the Bible and the adoption of the articles or confessions in the period between 1547 and 1573, and Protestantism became finally established under Queen Elizabeth. It may be said that the view taken by Lord Macaulay in regard to the Reformation is the correct one, since he looked upon the movement as consisting of two distinct phases, one applying to a reformation of the doctrine in the north of Europe, and the other in reforming the doctrine and discipline of the church in the Latin and Spanish countries. The intellectual impulse communicated by the Reformation is still in force and will never cease to exist.

REFORMED CHURCH, the name given first to the Helvetic Church, which rejected certain doctrines of Luther concerning the sacrament of communion, regarding it simply a commemorative ordinance. The term is used in history to comprehend all those churches that were organized as a result of the Reformation, but it is applied specially to several branches resulting from dissensions arising at conferences, such as Reformed Presbyterians and Reformed Episcopalians. The Reformed Church of the United States is a German body organized in Pennsylvania by settlers from Germany, about 1684. It now has 1,685 churches and 250,000 communicants, and maintains a number of missions and institutions of higher learning. The most important institutions include Franklin and Marshall College, Lancaster, Penn.; Heidelberg University, Tiffin, Ohio; Palatinate College, Myerstown, Penn.; and Catawba College, Newton, North Carolina. The Reformed Church of America is a Dutch organization, and was planted in the United States in 1628 by members of the Reformed Church of Holland, who settled at New Amsterdam, now New York. It has 625 churches, 125,000 communicants, eight institutions of higher learning, and a number of missions. The principal colleges are at Holland, Michigan; New Brunswick, New Jersey, and German Valley, Illinois.

REFRIGERATOR (rē-frĭg′ēr-ā-tēr), a chamber or box holding a supply of ice to cool provisions and keep them from spoiling in warm weather. Most refrigerators have two compartments, in the upper of which ice is stored to supply cooled air to come in contact with the provisions in the lower compartment, whereby they may be kept near the freezing point. Refrigerators used for household purposes are on this plan, and have a device to carry off the water that results from the ice melting. Those used in meat-markets are much larger than the devices employed for household purposes, but the same principles are utilized in them and in refrigerator railroad cars. The latter are employed in transporting meat, fruit, and other perishable commodities. See Ice.

REGENERATION (rē-jĕn-ēr-ā′shŭn), the Christian doctrine formally expounded by Jesus in his interview with Nicodemus, and generally held to be a radical and permanent change wrought in the spiritual nature of man by the Holy Spirit through faith in Christ. Regeneration is regarded by some churches as the beginning of the new life conferred in baptism, which is called the sacrament of regeneration; while others look upon it as a change in the governing purpose, or as the creation and continuation by the Holy Spirit of a new series of holy acts.

REGENSBURG (rā′gĕns-bo͝org), or **Ratisbon**, a city of Germany, capital of the Bavarian province of Upper Palatinate, on the Danube, sixty-five miles northeast of Munich. It is important as a commercial and railroad center, is strongly fortified, and has many interesting monuments dating from the Middle Ages. The streets are broad and well improved, having pavements, electric and gas lights, rapid transit, and numerous squares and parks. Among the

noteworthy buildings are the Church of St. James, a Byzantine structure of the 12th century, the town hall, and the Royal Library, containing 75,000 volumes. The city has a splendid monument in honor of Kepler, the astronomer, who resided and died in Regensburg. Its manufactures include beet-root sugar, jewelry, paper, metalware, pottery, soap, scientific instruments, and machinery. The city is one of the most ancient of Germany, and was founded by the Romans, by whom it was called Reginum. Population, 39,790.

REGENT (rē'jent), the name applied to a ruler who governs a monarchy during the minority, absence, or disability of the sovereign. The duties of this office usually devolve upon the nearest relative of the sovereign who is capable of undertaking them, especially in hereditary monarchies. The term is applied in the state of New York to a body of commissioners in whom is vested the superintendence of public instruction, and in many states to the presiding officer of the university. The term is used similarly in various countries in Europe, particularly to designate a member of one of the universities of England.

REGILLUS, a lake mentioned in the history of ancient Rome, situated southeast of the capital, in the crater of the extinct volcano Corunfelle. It is celebrated in legendry as the scene of an important battle, in 496 B. C., between the Romans and Latins, in which the former attained a signal victory. The lake was drained in the 17th century.

REGNAULT (reh-nō'), **Alexander Georges Henri**, eminent painter, born in Paris, France, Oct. 31, 1843; fell in battle Jan. 19, 1871. He was a son of Henri Victor Regnault (1810-1878), a French chemist and physicist, and studied art in Paris and Rome. After remaining in Rome two years, he went to Spain in 1869 to paint landscapes and views in relation to Moorish architecture and life. In 1870 he returned to France, where he entered the army as an enthusiastic supporter of the imperial government in the Franco-Prussian War, and was slain on the battlefield of Buzenval. His most famous painting is "Execution Without Judgment under the Moorish Kings of Granada." A monument in Paris commemorates him.

REGULUS, Marcus Atillius, Roman consul and general. Little is known of his early life, but it is certain that he was first elected to the consulship in 267 B. C., and that he received the honor of a triumph for his military successes soon after. He was made consul a second time in 256 B. C., and soon after headed a navy of 330 ships against the Carthaginians in the First Punic War. An engagement occurred off Heracles Minor, in which the Romans were successful, and shortly after Regulus established a station near Clypea. He was victorious in a number of encounters, but in 225 B. C. the Spartan Xanthippus commanded the forces of Carthage and not only defeated the Romans, but made Regulus a captive. On the arrival of reinforcements from Rome, Regulus was sent to the capital on parole to urge a treaty of peace, but when he reached Rome he urged the senate to refuse conditions of peace or the exchange of prisoners. On returning to captivity, he was put to torture and died from the effect.

REHAN, Ada, actress, born in Limerick, Ireland, April 22, 1860. She came to America with her father in 1866, settling permanently at Albany, New York. There she made her first appearance on the stage at the age of sixteen, and soon after engaged with Edwin Booth, with whom she remained until engaging with Augustin Daly in 1879. She went with his company to London in 1884, where she attained a reputation by appearing as Katharine in Shakespeare's "Taming of the Shrew." Other successful roles were acted by her in a number of plays of Tennyson and Shakespeare. She acquired popularity both in America and Europe.

REICHENBACH (rī'kẹn-bäk), **Karl, Baron von**, naturalist and technologist, born in Stuttgart, Germany, Feb. 12, 1788; died in Leipsic, Jan. 19, 1869. He was educated at Tübingen, and soon after conceived the project of establishing a German state in the South Sea, which was made an excuse for the French authorities to cause his arrest and confinement in the Hohenasperg fortress. Soon after his release his attention was turned to natural sciences and industrial arts, and in 1821 he established a number of manufacturing enterprises in Moravia. These not only proved highly successful, but were so profitable that he purchased large estates in Würtemburg, and was created a baron by the king. He continued his scientific investigations, and succeeded in discovering paraffin, creosote, and a number of compounds previously unknown. In later life he engaged enthusiastically in the study of animal magnetism, discovering a force in nature known as the odylic force. His most important publications are "Treatise on Geology;" "Year-Book of Chemistry and Physics;" "Sensibility and Odylic Force," and "Relations of Magnetism and Electricity to the Phenomena of Life."

REID, Mayne, soldier and author, born in Ulster, Ireland, in 1818; died in London, Oct. 22, 1883. He was educated for the church, but came to America in 1838 in search of a fortune. Much of his life in the United States was spent in roving adventures, in which he visited many states and studied the habits of Indians and pioneers on the frontiers. In 1845 he joined the American army and served through the Mexican War, attaining the rank of captain and taking part in the battles of Vera Cruz and Chapultepec. He returned to England in

1849 and began the career of a novelist. Reid wrote many interesting narratives of his adventures in the Mexican War and on the American frontiers. His best known writings include "Scalp Hunters;" "Rifle Rangers," and the "White Chief."

REID, Thomas, philosopher and author, born in Strachan, Scotland, April 26, 1710; died Oct. 7, 1796. He graduated from Aberdeen College in 1726, where he remained as librarian for ten years, spending much of his time in careful study. He was appointed minister of the parish church of New Machar in 1737, and labored incessantly until 1752, when he was elected professor of moral philosophy in King's College, Aberdeen. The professorship of moral philosophy in the University of Glasgow was given to him in 1763. Soon after he published his philosophical work, "Inquiry into the Human Mind." Reid was a patient, industrious thinker, but not a rhetorician. His style was simple and unadorned, but very clear. Among his writings are "Essay on Quantity;" "Philosophy of the Intellectual Powers," and "Essays on the Active Powers."

REID, Whitelaw, journalist, born in Xenia, Ohio, Oct. 27, 1837. He graduated from Miami University in 1856, and soon after took editorial charge of the "Xenia News." At the beginning of the Civil War he became the Washington correspondent of the "Cincinnati Gazette;" his articles appeared over the name of "Agate" and attracted general attention. Later he proceeded south with the army to describe various engagements, thus contributing much of value to war history. He accepted an editorial position on the "New York Tribune" in 1865, then edited by Horace Greeley, and at the death of the latter succeeded to the ownership of that journal. His ability and energy were not only sufficient to maintain the high standard of the paper secured under its former eminent editor, but he made it a political and financial success, taking prominent part in molding public opinion. President Harrison appointed him minister to France in 1889, and in 1892 he became the candidate of the republican party for vice-president along with Benjamin Harrison, but the ticket failed of election. Reid was for some time regent of the University of the State of New York, served as president of the Lotus Club of New York City, and is the author of a number of books relating to the war and to political subjects. Among the most noted are "After the War" and "Ohio in the War."

REIKIAVIK, or **Reykjavik** (rī'kĭ-ạ-vĭk), a city in Iceland, capital of Danish America. It is situated in the southwestern part of the island, on a large bay, and has a considerable trade in merchandise. Besides common schools, it has several institutions of higher learning, at which about 150 students attend. Telephones, electric lights, and waterworks are among the facilities. Population, 5,150.

REINDEER (rān'dēr), a species of mammals of the deer family, native to the northern regions of Eurasia. It has long been

REINDEER.

domesticated in Scandinavia, especially among the Laplanders, and in the northern parts of Asia, but is still found in the wild state in Spitzbergen and other sections of northern Eurasia. The reindeer differs from the common deer in being less gracefully formed, and in having stouter limbs, a heavier appearance, and in carrying its head less elevated. The antlers of the male are much larger than those of the female, and the upper parts are palmated or branched. There is a marked difference in size of the reindeer, this depending largely upon latitude, the largest species occurring in the regions farthest north. The usual height when full grown is about four and a half feet, the color brownish-yellow in winter and grayish-white in summer, and the horns are shed every year. The reindeer is valuable because of its flesh, hide, and milk. Large herds are reared in many sections of northern Eurasia, in Greenland and Iceland, and in several localities of North America. They are used as saddle and pack animals in Kamchatka, but serve chiefly for draught purposes. A single reindeer is capable of moving 200 pounds at the rate of from eight to ten miles per hour, and can endure work for a considerable time. The species of reindeer native to North America is the caribou, which includes several varieties, differing but slightly from those of Eurasia. Reindeer moss is a form of lichen of much importance because of its value as food for the reindeer, but these animals also feed on other forms of vegetation.

RELATIVE RANK, a term used in the army and navy to signify the precedence of officers. The following list indicates the ranks of combatant army officers in the United States and their equivalent in the navy:

ARMY.	NAVY.
General	Admiral
Lieutenant-General	Vice-Admiral
Major-General	Rear-Admiral
Brigadier-General	Commodore
Colonel	Captain
Lieutenant-Colonel	Commander
Major	Lieutenant-Commander
Captain	Lieutenant
First Lieutenant	Lieutenant (junior grade)
Second Lieutenant	Ensign

RELIGION (rē-lĭj′ŭn), the reverent feeling by which men indicate their recognition of the existence of a Supreme Being, to whom they attribute power over their destiny and render obedience, service, and honor. The religious feelings are experienced only in beings that possess advancement in intellectual and moral faculties to a moderately high degree. Religion differs from morality in that it denotes the influence and motives of human duty found in the character and will of God, while morality is concerned with the duties that one individual owes to another, but in their fulfillment true religion is a potent influence. As distinguished from theology, religion is subjective, in that it designates the feelings and acts of men relating to God, while theology is objective, denoting the beliefs and ideas that man entertains in respect to the God whom he worships according to the nature of his views. Darwin considers the feeling of religious devotion to be highly complex, since it includes love, complete submission, dependence, reverence, gratitude, fear, and hope for the future. On the other hand, Max-Müller regards religion a mental faculty that enables man to apprehend the Infinite under different names, even without the exercise of reason, and regards it as a mark of broad distinction between man and the lower animals.

The term religion is used also to imply forms of doctrines that have come down to the present time by tradition or in canonical books. When used in this sense, it extends to the different religious forms supported by people in all states of society, from the savage to the highly civilized, though the many different forms may be quite accurately divided into two general classes, the polytheistic and monotheistic. Those grouped under the former are systems that recognize a plurality of deities, while those belonging to the latter class recognize but one, an ever-existing, unchangeable, almighty God (q. v.). It may be said that all forms of religion are historically connected and related to each other, and have influenced one another in various ways that can be discovered quite easily by the study of history. Like the history of art, industry, science, and society in general, religion has been a process of development in which each stage has proceeded gradually from antecedent factors and conditions. However, it is not studied entirely from a historical standpoint, but in its unity and entirety, with a view to learn of its essence and all its essential relations. In this aspect it comprehends the philosophy of religion, and in an independent form it could not have been studied appropriately until both philosophy and theology were highly developed.

Writers have made various estimates of the different religious creeds supported in the world, but all of them are only approximately correct. The following table is taken from the most recently published reports, that place the entire number of religious worshipers at 1,490,464,202, as follows:

CHRISTIANS.		NON-CHRISTIANS.	
Roman Catholics	228,666,533	Confucians	200,000,000
Protestants	163,300,000	Hindus	210,000,000
Orthodox Greek Church	98,016,000	Mohammedans	250,000,000
Church of Abyssinia	3,000,000	Buddhists	147,900,000
Armenians	2,690,000	Polytheists	117,681,669
Coptics	260,000	Taoists	43,000,000
Nestorians	80,000	Shintoists	14,000,000
Jacobites	70,000	Jews	11,800,000
Total	496,082,533	Total	994,381,669

REMBRANDT (rĕm′brănt), **Hermensz Van Ryn**, eminent painter and etcher, born in Leyden, Holland, July 15, 1607; died in Amsterdam, Oct. 8, 1669. He was the son of a miller of the Rhine, near Leyden, studied in the Latin school of his native city, but in 1630 removed to Amsterdam, where he had studied art a number of years before. His numerous etchings and paintings are among the most excellent of the Netherlands, and he became the master of a number of skilled painters. Many of his productions are still extant, including portraits, landscapes, and genre and historical subjects, and besides these he produced about 375 etchings of merit. The excellent coloring, expression, blending of light and shade, and superior composition of his works show that he was not only original in devising, but that he possessed the peculiar skill and industry necessary to bring out the best results following devotion to human effort. A classification of his paintings recently made includes 280 different productions; some of those extant are valued highly. Among his most noted are "Jesus Healing the Sick;" "Jesus Before Pilate;" "John the Baptist Preaching;" "Simeon in the Temple;" "Wife of Samson;" "Descent from the Cross," and "Samson in Prison." His miscellaneous paintings include "Lesson in Anatomy;" "Night Watch;" "Portrait of Jan X.;" "Syndics of Amsterdam," and "Burgomaster and his Wife."

HERMENSZ V. REMBRANDT.

REMENYI, Edouard, noted violinist, born in Heves, Hungary, in 1830. He studied under Joseph Bohm in Vienna from 1842 to 1845, but was banished from the country because he took part in the Revolution of 1848. Soon after he made a tour of the United States, and played in many of the leading cities a second time in 1893. His skill on the violin elicited applause in the leading cities of Europe, America, and other parts of the world, particularly because of its being characterized by much life and a mastery of technique.

REMUSAT (rā-mü-zä'), **Charles Francois,** statesman and philosopher, born in Paris, France, March 14, 1797; died June 6, 1875. He was educated at the Lyceé Napoleon, and soon after engaged in journalism. In 1818 he became closely connected with the party leadership of Guizot, and published a pamphlet of considerable merit on "Trial by Jury." He became a contributor to the "Globe" in 1824, and in 1830 entered the French chambers as deputy, in which he was an influential member till 1848. His support was given to the ministry of Casimir Perier, and when the government passed to Thiers he became minister of the interior. Louis Napoleon exiled him when he ascended the French throne in 1851, and while abroad he gave his attention to literary and scientific studies, but when Thiers became president, in 1871, he was called to the portfolio of foreign affairs, in which he served with distinction till 1873. He is the author of a number of excellent works on scientific subjects, the most noted production being his "Essays on Philosophy."

RĒNAN (rẹh-nŏn'), **Joseph Ernest,** historian and essayist, born in Tréguier, France, Feb. 27, 1823; died in Paris, Oct. 2, 1892. He first attended school in his native town, but in 1839 entered the Seminary of St. Sulpice, Paris, where he studied for holy orders in the Catholic Church. In 1845 he abandoned his former view to become a priest, but continued to pursue the study of Hebrew, German, and other languages with untiring energy. He was granted a prize in 1848 for a memoir on the Semitic languages. In 1849 he was sent on a literary mission to Italy, and in 1856 became a member of the Academy of Inscriptions. His next recognition came in the form of an appointment to study Phœnician civilization by making a tour to Syria, when he visited various parts of the Holy Land, which enabled him to publish his work entitled "Life of Jesus." In this he expressed skeptical views in relation to many accepted traditions, which caused public opinion to turn against him to such an extent that he had to abandon his professorship of Chaldee, Syriac, and Hebrew in the College of France, to which he had been elected in 1862. In 1871 he was restored to that position. He became a member of the French Academy in 1878, received the cross of the Legion of Honor in 1880, and was made grand officer in 1888. The works of Renan are very numerous, though his "Life of Jesus" is the best known and has been translated into many languages. Other works include "History of Israel;" "History of the Origin of Christianity;" "Recollections of My Youth," and "Influence of the Thought and Culture of Rome on Christianity."

RENNES (rĕn), a city of France, formerly capital of Brittany, at the confluence of the Ille and Vilaine rivers, 190 miles southwest of Paris. It is on both sides of the Vilaine River, which is crossed by a number of excellent bridges. Among the noteworthy buildings are a cathedral of modern Grecian construction, the palace of justice, a number of fine schools, several hospitals, and a university. The manufactures include shoes, sailcloth, cotton and woolen goods, yarn, lace, paper, and earthenware. The city is surrounded by a fertile country, and has important railroad facilities and river and canal navigation. It is well fortified and has a large arsenal. Population, 70,212.

RENO, a city in Nevada, county seat of Washoe county, in the western part of the state. It is situated at a railway junction, about sixteen miles north of Virginia City, on the Truckee River. The surrounding country is farming and mining. It is the seat of the Nevada State University, the Bishop Whitaker School for Girls, and several public schools. Reno has a considerable trade in merchandise. Population, 1900, 4,500.

RENT, the compensation paid for the possession and use of land, houses, or property of any kind. The term is applied in an economic sense only to the annual payment made for the use of lands employed in producing such wealth as it yields by tilling. In this sense it attaches to and proceeds from things fixed or immovable. It is paid either in money at a fixed amount annually, or by giving a share of the crops produced. The rate of rent accruing to a landlord may be said to be fixed by free competition, since the character of the work done by the tenant and the rate offered for possession determine largely what particular person may occupy the land. Rents depend chiefly upon fertility of the soil, facility or difficulty of cultivation, and situation as to an available market. That the highest rents may be secured for lands of fertile soil is quite apparent, and it is also important that it be of such a character as to render cultivation reasonably easy, otherwise the extra expense for machinery and labor renders production more costly and the profits correspondingly less. Proximity to market is a very important factor, since thereby the capabilities of the soil can be more easily utilized. Besides, the cost of transportation to a distant market materially reduces profit, and renders it less easy to place the products for sale at the most opportune time. The factor of

maintaining virgin fertility of the soil is also taken into account and even enhancing its productiveness, which is always facilitated by nearness to a large city, through enlarged consumption on the farm, or by returning to the land an equivalent for what is produced. In many cases the productive quality of the soil has been increased two, five, or even tenfold by tilling, careful cultivation, and the addition of manures hauled from the cities.

REPTILES (rĕp'tĭlz), a class of cold-blooded air-breathing vertebrates. They are classed as occupying a place in the animal kingdom between birds and amphibians. The body is generally elongated, terminating in a long tail, and the skin in most species is covered with scales or scutes. They are distinguished from the amphibians in that they breathe air through lungs during the whole period of their lives, and from birds in having scales instead of feathers, and cold blood. Like birds, many species of reptiles are oviparous; that is, their young are produced from eggs incubated outside the body; while some are ovoviviparous, producing eggs that are incubated or hatched within the parent's body. Most species have four limbs, which are barely long enough to keep the body from the ground, but many are without limbs, as the serpents and some of the lizards. When present, the limbs have many carpal and metacarpal bones.

Reptiles are now classed in ten orders, six of which are extinct. The four represented by living forms include the Lacertalia, Crocodilia, Ophidia, and Chelonia. The order of Lacertalia includes the lizards, chameleons, and blind-worms; the Crocodilia embraces crocodiles, alligators, and gavials; the Ophidia includes the snakes; and the Chelonia comprises the turtles and tortoises. All the turtles and tortoises have a round body, which is covered by a hard shell, and they are characterized by a long tail. The senses are more highly developed than those of fishes, but duller than in birds and mammals. Nearly all are slow in their movements, but, as they bear more bruising than other animals, their life is less easily destroyed. Most species of reptiles are flesh-eating. Snakes swallow their food whole, the stomach and gullet being capable of great distension, while crocodiles and tortoises masticate quite carefully. In some cases, as in the python, the eggs are hatched by the warmth of the body, but they are mostly laid in the warm sand to be hatched by the sun, or by the warmth of decaying vegetable matter. Reptiles are most numerous in warm climates, where they also attain their greatest size. Some are aquatic, as certain snakes, crocodiles, and tortoises; and others live in trees or burrow in the ground, as the lizards. They generally hibernate in winter, or the cold season. The crocodiles and alligators are the largest living reptiles, and the structure of the vital organs most nearly resemble those of the birds. Snakes are peculiar for shedding the skin periodically. About 2,000 species of reptiles have been enumerated.

REPUBLIC, the form of government in which the sovereignty resides in the people, and the administration is lodged in officers elected by and who represent the people. The element of democracy is necessarily included in the management of a republic, since the extension of suffrage to the people is democratic, while the representative feature in law-making and law-executing is the republican element. The government of the United States is democratic-republican, but it is generally known as a republic. In reality there are two distinct classes of governments in our country, known as state and federal. Before the thirteen original states ratified the constitution each possessed an independent national sovereignty. When it entered the federal union it became subject to the general constitution, but it retained a dependent republican government. The nation is bound to preserve the right of republican government in each of the states, an obligation laid upon it by the national constitution. Thus each state has a constitution more or less similar to that of the other states, and is dependent upon and limited by the constitution of the federal government.

Republics had their origin in the opposition that prevailed against hereditary monarchies, as was the case in Greece, Rome, and America. The essential features have continued to be principally the control of the chief executive by elections and in laws emanating from assemblies chosen by an enfranchised class. In ancient Greece the government of the small states partook of the nature of a democracy, where the whole body of citizens met to enact their laws, while the republics of Genoa, Venice, and others of mediæval Italy partook of the nature of an oligarchy, since the right of suffrage was vested almost entirely in the nobles and a few privileged individuals. The representative form prevails in all modern republics. Nearly all have a written constitution. They vest the right of suffrage in the male citizens. In most cases they choose the chief executive indirectly, some through an electoral college, as in the United States; or by the legislature, as in France and Switzerland. The legislative authority is generally vested in an assembly of two chambers or houses, and the judiciary has power to pass upon the constitutionality of laws and executive acts.

Switzerland and France are the only powerful republics of Europe, but there are three others—Andorra, Monaco, and San Marino; the last named is the oldest republic in the world. It is situated on the Italian coast of the Adriatic Sea, and dates from the 4th century. France was a republic at three different periods, in 1793-1804, in 1848-1852,

and from 1870 to the present time. The seven provinces of Holland organized a republic at the time of their separation from Spain and maintained it till 1815. The government of England was a nominal republic from 1649 to 1660, and Spain was so governed at two periods—in 1868-69 and in 1873-74. In 1776 the American colonies declared their independence, but the United States was not organized as a constitutional republic until 1789. Mexico obtained its republican government in 1824, which it has ever since possessed, except in the brief period of Maximilian's reign from 1863 to 1867. All the independent governments of America are now republics, Brazil obtaining that form of government in 1889. At present there is a marked tendency toward the establishment of republics, and toward limiting the power of monarchies by constitutions. It is not at all improbable that the present century will witness the establishment of republics in many regions governed at present by powerful monarchies.

REPUBLIC, Grand Army of The, a patriotic and fraternal association of soldiers and sailors of the Union. The object of the association is to preserve the spirit of comradeship among those who endured the hardships of military or naval service; to care for sick and disabled comrades; and to provide for all those who are in need or distress, including the widows and orphans. The first post was organized at Decatur, Illinois, April 6, 1866, in accordance with suggestions and plans made by B. F. Stephenson, a surgeon of Springfield, Illinois. The first national encampment convened at Indianapolis, Indiana, Nov. 20, 1866. At present there are 6,975 posts, forty-five departments, and a membership of 287,981. The initials of the order are G. A. R.; the motto, Fraternity, Charity, and Loyalty; and the badge consists of an eagle and a star, with a ribbon representing the flag. Veterans wear a bronze button as an insignia of the order. The discussion of partisan questions at its meetings is forbidden by the rules, and any attempt to make the association a factor in partisan politics is prohibited. Posts usually hold meetings every week. Besides these are annual reunions of various organizations and military commands, and banquets, camp-fires, and a national encampment. On Memorial Day the different posts decorate the graves of their fallen comrades, either by going in a body to the cemetery or by detailing committees for that purpose. The meetings of soldiers in the capacity of reunions and encampments are always of more than local interest. Visiting members and friends come considerable distances to witness the greetings extended, and to enjoy instrumental music and patriotic songs. Speeches in relation to the unwritten history of the war, or the important duties confronting the citizens of the republic at the present time, are delivered by members of the posts and others. This association has been instrumental in causing many monuments to be erected in commemoration of the valor of soldiers and sailors. It has been active in promoting the establishment of soldiers' and sailors' homes, homes for widows and orphans of soldiers and sailors, and the extension of charitable and educational facilities. The Woman's Relief Corps and Sons of Veterans are auxiliary organizations.

REPUBLICAN PARTY, the name first applied to the party formed by Jefferson in opposition to the federalists, which assumed the name as an advocate of a republic, while its opponents were classed as monarchists. However, the name soon gave way to that of democrat, chiefly because the party advocated vesting large powers in the people. The present republican party was not organized until in 1854. It was formed by a union of smaller parties and factions that left the whigs and democrats on account of various phases of the slavery question. It may be said that the whig party was disrupted by the compromise of 1850. In 1854 the democrats passed the Kansas-Nebraska act, which was immediately followed by a union of various elements that united in opposition to that measure, among them the know-nothings, abolitionists, northern free-soilers, whigs, and numerous democrats. The party was first known as anti-Nebraska men, but soon assumed the name of republican and won a plurality in congress. In 1856 the first national convention was held in Philadelphia, which nominated Fremont and Dayton. The platform adopted by this convention declared against the repeal of the Missouri Compromise, opposed the extension of slavery to the territories, and advocated the admission of Kansas as a free state and the construction of a railroad to the Pacific. In the campaign "Free soil, free speech, free men, Fremont" became the rallying cry, and, though overwhelmingly defeated, the party elected ninety-two out of 237 congressmen.

Thousands of voters broke away from the democratic party on account of the Dred Scott decision and the Lecompton bill, and the division of that party in 1860 brought about the election of Abraham Lincoln. The first election of a president by the republicans hastened on the Civil War, but before 1864 a split occurred in the party, the dissenting faction nominating John C. Fremont for president at a convention in Cleveland. However, the republicans temporarily assumed the name of the national union party, renominated Lincoln, and placed Andrew Johnson, a democrat, on the ticket for vice-president. The latter succeeded to the presidency in 1865, owing to the death of Lincoln, and immediately the question of reconstruction began to agitate the nation. The fourteenth amendment, the civil rights bill, the reconstruction bill, the

Freedmen's Bureau bill, and the tenure of office act were passed. President Johnson's opposition to a number of these measures led to his impeachment, but he was not convicted.

A new class of leaders rose with the election of General Grant in 1868, among them Sherman, Blaine, Conkling, Edmunds, and Allison. President Grant was reëlected for a second term, and was followed successively by Hayes and Garfield. The latter dying in office, he was succeeded by Chester A. Arthur. In 1884 the nomination of Blaine caused a division of the party in New York and other eastern states, thus assuring the election of Grover Cleveland, the democratic candidate. However, Benjamin Harrison was elected in 1888. He was defeated when a candidate for reëlection, in 1892, by his democratic opponent, Grover Cleveland. The party elected William McKinley in 1896, and reëlected him in 1900. After his assassination, in 1901, he was succeeded by Theodore Roosevelt, who was elected president in 1904.

The republican party has always depended for its strength upon the north and west, though in 1896 it lost practically every state west of the Missouri. Like all other parties, its positions have been modified by the character of national events, but it has been constant as an advocate of national banks, a high protective tariff, and internal improvements during its entire existence. Among the positions taken on questions already settled or now in a state of discussion are those including opposition to the extension of slavery, in favor of a vigorous prosecution of the Civil War, the emancipation proclamation, the demonetization of silver in 1873, the resumption of specie payment in 1879, a general increase in pensions, the acquisition of territorial possessions in regions remote from the United States, and an increase in the standing army. The period of American history during which the republican party controlled the executive branch of the government is thirty-six years.

REPUDIATION (rē-pū-dĭ-ā′shŭn), the rejection of the whole or part of a contract, debt, or obligation. The several states are limited by the constitution in that they may not pass laws to impair the obligations of contracts, but the eleventh amendment provides that the federal supreme court has no jurisdiction of suits brought against a state by a citizen of another state. Hence, states have been at liberty to either repudiate or acknowledge debts, but acts of repudiation have occurred generally only on grounds of unlawful or fraudulent transfer coupled with failure of consideration. This was the case in 1841, when Mississippi repudiated bonds issued to railroad companies, which failed to comply with the conditions on which they received them. Among the other states repudiating at various times are Georgia, Alabama, Louisiana, Minnesota, Florida, Michigan, Tennessee, Arkansas, Virginia, and the Carolinas, though in some states bills were passed to refund the debts.

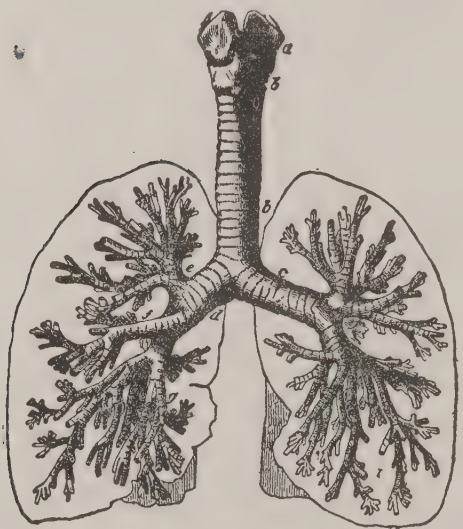
RESERVATION (rĕz-ēr-vā′shŭn), a tract of land set apart by the United States for public uses or for special purposes. A large number of reservations have been made in various parts of the states and territories for divers purposes, such as providing sites for forts and government buildings, and to preserve lands for special uses. The most extensive reservations are the Yellowstone National Park and the tracts set apart for occupation by the Indians.

RESINS (rĕz′ĭns), a class of vegetable substances, supposed to be the product of oxidation of volatile oils secreted by certain plants. They are hard or soft according to the amount of oil they contain and the length of time they have been exposed to the air. Resins are either transparent or translucent, somewhat elastic, and generally are soluble in alcohol but insoluble in water. The resins are divided into three general classes, including those obtained from fossils, those extracted from plants by alcohol, and those exuding from plants spontaneously. Those obtained from fossils are derived from amber, coal, asphalt, and lignite; those extracted from plants by alcohol embrace such as the resins of angelica root, which generally contain definite carbon compounds; and those that exude from living plants include benzoin, Peru balsam, turpentine, lac, myrrh, copal, jalap, and storax. The latter class are obtained by making incisions in the stems and branches of plants, but in some plants they form drops or tears naturally. Many of the resins are used in medicine and mechanic arts, and are sold extensively as commodities in trade.

RESPIRATION (rĕs-pĭ-rā′shŭn), the process of breathing, which consists of two acts: taking in the air, or inspiration, and expelling the air, or expiration. It is partly nutritive and partly excretory in its character, since it revives the blood by taking in oxygen and casts out waste products in the form of carbonic acid. Besides carbonic acid, there is a quantity of water and organic matter given out by the breath, which may be seen more or less clearly by breathing on a glass or window-pane at low temperature. Respiration is carried on in man and the higher animals mainly by the lungs. The air enters into the mouth or nose, passes through the larynx, a kind of hollow chamber extending from near the root of the tongue to the trachea or windpipe, whence it passes into the lungs through two bronchial tubes. On entering the lungs the bronchial tubes divide and subdivide, usually by twos, into smaller tubes called bronchi, and then the whole appears like a tree with many branches. The larynx is a framework made up of cartilages held together by small ligaments, and forms the projection called Adam's apple. An elastic

plate called the epiglottis is at the upper opening of the larynx, which closes down over its entrance while swallowing, thus preventing the admission of food substances into the bronchial tubes.

The tubes in the lungs terminate in minute



LUNGS.

Distribution of Air-tubes in Mammalian Lungs. *a*, larynx; *b*, *b*, trachea; *c*, *d*, left and right bronchial tubes; *e*, *f*, *g*, the ramifications.

air-cells, which are enclosed by transparent and very thin walls, and through them ramify minute blood-vessels, lymphatics, and nerves. As the air enters the lungs, the diaphragm, a thin partition between the chest and the abdomen, is lowered, while the ribs are raised, thus increasing the size of the chest. Thereupon, the elastic lungs expand to occupy the extra space, while the air rushes in through the windpipe and pours along the bronchial tubes, crowding into every cell. The operation is reversed when the air is expelled. The walls of the abdomen are drawn in, the diaphragm pressed upward, and the ribs are pulled downward, thus diminishing the size of the chest and forcing the air outward. Ordinary breathing is done mainly by moving the diaphragm. It takes place about eighteen times per minute during the waking hours, or at the rate of one breath to every four beats of the heart. The lungs of a healthy adult have a capacity for about 330 cubic inches of air, and in ordinary breathing about thirty cubic inches pass in and out, though it is possible to take in fully one hundred cubic inches in a deep inspiration. A quantity of air is always in the lungs. The constant supply is equal to about one hundred cubic inches; this is important for the reason that the action of the air goes on continuously.

In the process of breathing the blood comes in contact with the air as it is pressed into the air cells of the lungs, where it takes up the oxygen and in turn gives up carbonic acid gas and other impurities taken up in its circulation through the body. By this process it is changed from dark blue to a bright red color. Thus purified and laden with the inspiring oxygen, it goes bounding through the system, while the air we exhale carries off the impurities. If respiration is interfered with, the arterial blood becomes dark like that of the veins, and when death takes place by asphyxia, as it does when respiration is impeded, the body assumes a very dark color. Foul matter passed off from the lungs diffuses itself through the surrounding atmosphere, and, if good ventilation is not provided in rooms occupied by a number of persons, the air becomes largely poisoned by impurities. As a result the system suffers from a lack of oxygen, which is speedily followed by drowsiness, headache, catarrh, and finally by serious and fatal diseases.

Respiration in fishes is carried on by the gills, the water inhaled giving up oxygen, while that exhaled carries off nitrogen and other impurities. The reason that fishes cannot long endure in stagnant water is that oxygen is rapidly consumed in the process of breathing; thus it becomes necessary to frequently replace water in vessels where fish are kept. No special apparatus is provided for the aëration of fluids in the body of the lowest and simplest forms of animals, this being effected by the general movements of the body, or by cilia producing the necessary currents. Some animals are incapable of breathing either air or water, and in such the process is carried on by the skin or through small sacs at regular intervals on each side of the body, as in the leech and earthworm. Respiration is carried on in insects by spiracles opening into tubes, which communicate with each other through the body. Plants have a respiratory process somewhat similar to that of animals, but they take in carbonic acid as the vital element and exhale oxygen, thus reversing the action of the animal. However, the normal respiration in plants takes place only in the presence of light. Thus it will be seen that nature has provided elements alike essential to both forms of life, and that each is dependent at least to some extent on the other.

RETORT (rē-tôrt′), a vessel used for the decomposition of compound bodies by heat, or for distillation. The retort of the chemical laboratory is of glass, platinum, porcelain, or other material. It consists essentially of a bulb with a long neck attached, in which the products of distillation are condensed, and from it they pass into the receiver. Retorts are of various shapes, and the materials from which they are made differ somewhat with the uses they are to serve. Where a high degree of heat is necessary, iron or metal retorts are used, since glass and many other substances are not proof against a high temperature.

REUTER (roi'tẹr), **Fritz**, novelist and poet, born in Stavenhagen, Germany, Nov. 7, 1810; died in Eisenach, June 12, 1874. He studied under private tutors until 1832, when he entered the University of Jena, and in 1833 engaged in revolutionary agitation against the Prussian government. This brought about his arrest for high treason, and after trial he was condemned to death, but the sentence was commuted to imprisonment for thirty years by Frederick William III. He was set free in 1840 by an amnesty issued when Frederick William IV. ascended the Prussian throne, and henceforth gave his entire attention to literature. His writings are realistic in character, dealing mostly with the actual conditions of life, and many of them are remarkably popular on account of the happy manner in which he describes incidents and circumstances with which he met. Most of his poems and some of his novels are written in the Platt-Deutsch dialect. "My Prison Days" and "In the Year 113" are his best known works.

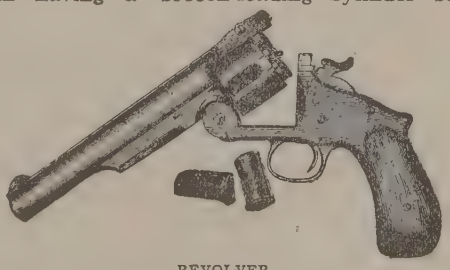
REVAL (rĕv'ẹl), or **Revel**, an important seaport of Russia, capital of Esthonia, on the Gulf of Finland. It is 200 miles southwest of St. Petersburg, with which it is connected by railroads. Among its noteworthy buildings is a fine cathedral, several schools and hospitals, and a number of beautiful parks. The city has a system of waterworks, the supply being carried from Lake Jarvakyla by an aqueduct. It has manufactures of machinery, clothing, cotton and woolen goods, utensils, and cordage. The imports and exports are extensive, and it is a favorite summer resort for sea-bathing. Population, 52,916.

REVERE, a city of Massachusetts, in Suffolk county, a short distance northeast of Boston. It is improved by street pavements, waterworks, and railroad and electric car lines. Many Boston business men make it their place of residence. The city has fine school and church buildings. Population, 1900, 10,395.

REVERE (rẹ-veer'), **Paul**, patriot, born in Boston, Mass., Jan. 1, 1735; died May 10, 1818. He was by trade a goldsmith and practiced copper-plate engraving. Many events of the times preceding the Revolution were illustrated by him in engravings and caricatures. He was one of the prime movers of the Boston Tea Party, and on April 18, 1775, apprised the citizens of Lexington and Concord of the intended expedition of the British. This eventful act was made the subject of Longfellow's poem, "Paul Revere's Ride." He entered the army at the beginning of the war, and attained to the rank of lieutenant-colonel of artillery. Subsequent to the war he established the Revere Copper Company, the first company to refine and roll copper in America, and which is still doing business. In 1795 he laid the corner-stone of the Massachusetts capitol, and founded the Charitable Mechanical Association.

REVOLUTION (rĕv-ō-lū'shŭn), any fundamental change in government, or a revolt against an existing government and the establishment of a new one in its stead. Revolutions are mainly brought about by internal causes, and the change must be accomplished completely to constitute a revolution, otherwise it is generally termed a rebellion or an insurrection. Among the notable revolutions of modern times is that of England in the 17th century, which began in 1642 with a quarrel between Charles I. and his parliament, and ended in 1649, when the king was brought to the block. A republic followed with Oliver Cromwell as protector, but the monarchy was restored in 1660 by the return of Charles II. The great Revolution in America began in 1776, when the colonies declared their independence from Great Britain. It ended with the surrender of Cornwallis at Yorktown in 1781. The great Revolution of France began at Paris in 1789, and ended with the beheading of Louis XVI. on Jan. 21, 1793, though some writers place the end in 1794, when Robespierre was guillotined. Two other revolutions occurred in France. The one of 1830 deposed Charles X. and placed Louis Philippe on the throne; and the Revolution of 1848 established the second republic. Some writers regard the establishment of the third French republic, in 1871, as a revolution. The republics of South America were practically all established by revolution, though the one of 1889, when Brazil became a republic, was without bloodshed.

REVOLVER (rẽ-vŏlv'ẽr), a firearm resembling the pistol, but differing from it in having a breech-loading cylinder so



REVOLVER.

arranged that the cocking of the hammer revolves it and brings the next cartridge in line for firing. Many kinds of revolvers are in use. They have from three to six chambers in the cylinder, and differ widely in size and mechanical construction. The cheaper kinds are cocked by means of pulling the hammer back with the finger, while the more expensive are self-cocking; that is, they may be cocked and discharged by simply pulling the trigger. Others are made with a concealed hammer, thus guarding against the danger of being discharged by accident. In some revolvers is a safety latch to prevent them from being fired without first releasing the internal hammer by pres-

sure. In 1818 Elisha H. Collier patented the first weapon of this kind in the United States, and in 1835 Samuel Colt invented the famous revolver that bears his name. The principle employed in a revolver is used also in rifles and guns designed to throw small projectiles, as in machine-guns of the Gatling kind.

REYNARD THE FOX, an epic fable of the Middle Ages, written at some time between the 10th and 12th centuries. However, the first printed edition did not appear until 1517, when it was published at Rostock, Germany. It was written in the Low German dialect by one signing himself Hinreck van Alckmer, but the real name of the author is believed to be Hermann Barkhausen, a bookprinter in Rostock, who wrote under a pseudonym. The characters in the story are animals, which are represented as speakers and actors. They are treated with such a degree of interest that many translations have been made into different languages, and few fables are at present better known or more popular.

The writer of Reynard the Fox represents that on one eastertide Nobel the Lion, king of beasts, held court, to which he summoned all the animals, both great and small, to do him homage. All gave willing obedience to the summons except Reynard the Fox, who was promptly summoned for this and other misdeeds to appear before the king of beasts, Bruin the Bear being sent to command his attendance. However, Reynard employed his well-known tactics to escape punishment by informing Bruin that a rich fund of honey could be found in a split tree, to which the bear at once hastened, but got fastened in his attempt to secure the honey and was almost beaten to death by angered peasants before he was able to escape. The Lion next sent Tibert the Cat as a messenger, but Reynard persuaded him to go on a chase by relating that a nest of mice could be found in a certain place, and in attempting to secure the prize he was caught in a noose and barely escaped with his life. Grimbart the Badger next went as a messenger, and being less vain than those who had gone before, he succeeded in persuading Reynard to appear at court, where he was at once tried and it was decided that he should die. His death was to be by hanging.

When Reynard the Fox had ascended the gallows, he was asked if he had something further to say before suffering death. Instead of making a confession of his guilt, he turned to the Lion and informed him that Bruin the Bear and Isengrim the Wolf had planned to kill the Lion; but since he and his old father Reynard were not friends of the wicked Bear he had stolen and hidden their treasure, for which reason he wanted to inform the Lion of his danger. The king of beasts at once pardoned Reynard and imprisoned both Bruin and Isengrim. Trouble again arose when the Lion wanted Reynard to show him the treasures, but he soon excused himself by saying that it was secure at some distance and that he did not have time to look it up immediately, as he had taken an oath to go to Rome on a pilgrimage. This was cause enough for the Lion to let Reynard go at once to redeem his vow. However, he took Belim the Ram and Cuwaert the Hare with him. Soon after starting the three came to the home of Reynard, which he induced the Hare to enter by promising him rest and a good meal, but at once fell upon him and ate all but his head. This he put into a sealed satchel, which he sent back to the Lion by the Ram, telling the latter that it contained letters of great value. When the Ram reached the court of the Lion, the king of beasts was greatly angered, and not only declared the Fox an outlaw, but gave freedom to the Wolf and Bear. It happened soon after that the Wolf and Fox met in the forest, when the former undertook to punish Reynard for causing him to be imprisoned, but the latter won a victory by his cunning and was thereby restored to the protection of the Lion.

REYNOLDS (rĕn'ŏlz), **John Fulton**, soldier, born in Lancaster, Penn., Sept. 20, 1820; killed in battle July 1, 1863. He graduated at the West Point Military Academy in 1841, was given a commission as first-lieutenant in 1846, and served in the Mexican War, securing especial distinction in the battles of Monterey and Buena Vista. Soon after the close of the Mexican War he served against the Indians in Utah, and in 1859 became commandant of cadets at West Point. In 1861 he was made brigadier-general of volunteers, taking part in the campaigns of the army of the Potomac, and was taken prisoner, but was exchanged soon after. He became major-general in 1862, and in the same year succeeded General Hooker in command of the first army corps, but on the first day of the battle of Gettysburg he was killed in action by a rifle-ball. A number of monuments have been erected to his honor, one in Philadelphia and another on the spot where he fell and died.

REYNOLDS, Sir Joshua, portrait painter, born at Plympton, England, July 16, 1723; died Feb. 23, 1792. He was a son of Samuel Reynolds, rector of Plympton, who wished him to study medicine. However, his taste for painting secured a preference at an early age, and by the kindness of Captain Keppel he was enabled to study art in Italy for three years. In 1752 he returned to England, and soon after established a studio in London, where he became noted as the most eminent portrait painter since Van Dyck. He was elected president of the newly organized Royal Academy in 1769. King George III. knighted him, and at the death of Ramsey, in 1784, he became painter to the court. About 700 engravings have been made from the pictures of Reynolds.

Among his productions are portraits of the most eminent personages of his time. His works are especially beautiful on account of trueness to life and exactness of detail. Reynolds was a personal friend of the most distinguished scholars and literary men of his day, among them Johnson, Goldsmith, Burke, and Garrick. He is the author of "Discourses on Painting," which he delivered in lectures before the Royal Academy. Besides the large number of portraits furnished by him, he painted other pictures, among them "Holy Family;" "Macbeth," and "Death of Cardinal Beaufort."

RHEIMS (rēmz), or **Reims**, a city of France, in the department of Marne, on the Vesle River, eighty miles northeast of Paris. It is located in a fertile region, has extensive railroad facilities, and is one of the important commercial and manufacturing cities of France. A large cathedral in the Gothic style of architecture was built at Rheims in the 13th century. It has many other churches, several institutions of higher learning, and a fine public school system. The manufactures include cotton and woolen goods, blankets, champagne, machinery, earthenware, toys, and scientific instruments. It has been the seat of an archbishopric since the 8th century, and was made the place of coronation in 1179, when Philip Augustus was crowned there. Rheims is famous as the place where Clovis was baptized in 496; for the crowning of the dauphin in the presence of Joan of Arc, and for the fact that all the French kings were crowned there down to 1825, except Henry IV., Napoleon I., and Louis XVIII. The city was occupied by the Germans in 1870-71. Extensive railroad building in France has caused the city to grow with remarkable rapidity. Population, 105,360.

RHETORIC (rĕt'ŏ-rĭk), the art that treats of discourse, or the expression of thought by means of language, either oral or written. Aristotle wrote the first treatise on rhetoric, a work that is still considered valuable as a text of reference. He treated the subject as a branch of logic, and applied its rules largely to oratory. Aristophanes of Byzantium was the first to introduce rhetorical points and accents, and Quintilian carried on teaching in rhetoric in the Roman capital for more than twenty years, publishing his famous work on the subject, entitled "Education of an Orator." It may be said that Quackenbos (q. v.) is among the best known American writers on the subject. Rhetoric is divided into two parts, style and invention. The former treats of the manner of expression, and as a word was derived from the Latin stylus, a small steel instrument used by the Romans for writing on waxen tablets. Invention in rhetoric is the art of putting together what one has to say on a subject. It does not include finding out what to say, but rather consists in putting statements of facts, our observations upon men and things, our feelings, and our conclusions into readable shape. The subject of invention is so extensive and complicated that no two authorities exactly agree upon every detail. As a whole, it may be said that rhetoric is the art by which the discourse is adapted to its end. This includes at least four important purposes in speaking or writing: namely, to enlighten the understanding, to please the imagination, to move the passions, and to influence the will.

RHEUMATISM (rụ'mȧ-tĭz'm), an inflammation or malady with aching pain, usually of a variable or acute nature. It affects equally the muscles, the joints, and other structures. Exposure to cold and damp are among the ordinary causes of rheumatism, but it also results from severe labor, insufficient nutrition, and the reduction of vitality by an over-consumption of stimulative food without sufficient exercise to eliminate the waste from the system. No specific time in life can be assigned in which it may attack the body, but rheumatic affections are most frequent between the ages of fifteen and thirty-five years. Acute cases are generally attended by affections of the heart, particularly of the pericardium. Young persons are frequently attacked by a form known as St. Vitus' dance. Swollen joints attended by severe pain often accompany rheumatism. Complicated cases usually become chronic, often ending in severe deformity and twisting of the joints. Rheumatism is more or less hereditary.

RHINE (rīn), an important river of Europe, and one of the finest and most historical. It rises in Switzerland, has a general course of about 825 miles toward the north and west, and flows into the North Sea. Two streams form the Rhine in the Swiss canton of Grisons, which are known as the Vorder Rhein and the Hinter Rhein. A short distance below the junction it passes through Lake Constance, and at the town of Bâle turns toward the north and enters Germany, in which country most of the river is located. The part from the vicinity of St. Gothard's Tunnel to Basel is generally known as the Upper Rhein; the part from Basel to Cologne, as the Middle Rhein, and from Cologne to the North Sea, as the Lower Rhein. It enters Holland after turning toward the west, but soon divides into numerous branches, entering the sea by a delta. The Rhine is an important commercial highway, being navigable a distance of nearly 600 miles. It is connected by numerous important canals with other river systems, among them those of the Danube and the Rhone. On its banks are many thriving cities, including Arnheim, Leyden, and Utrecht in Holland; Bonn, Coblentz, Cologne, Düsseldorf, Mentz, Mannheim, Strasburg, Spires, and Worms in Germany; and Constance and Bâle in Switzerland. Its principal tributaries are the Aar, Moselle, Main, Neckar, and Lippe rivers. The

scenery of the Rhine is noted for its great beauty, both in Switzerland and Germany, but particularly in the latter country. In Holland it is less beautiful, owing to the generally level character of the region through which it passes. Much of the land of the Rhine delta has been redeemed by dykes. In some places the embankments are nearly thirty feet above sea-level.

RHINOCEROS (rī-nŏs'ĕ-rŏs), an animal allied to the elephant, tapir, and hippopotamus, and next to the elephant the most pow-

RHINOCEROS.

erful now living. A number of species have been described, all of which are native to the warmer parts of Asia and Africa. They are usually harmless and of low intelligence, but display considerable ferocity when provoked, and can run with great speed. The largest are about six feet in height at the shoulders, with short legs and a very heavy and solid body. They feed on grass and other vegetable forms. Most species prefer to loiter in marshes and on the banks of streams, where they wallow in the mud, while some frequent open country. Their flesh is eaten by natives, and their skin, which is thick enough to be proof against the claws of lions and even bullets, except at the neck and head, is used for whips and shields. One young is brought forth at a time. Little more than mere traces of hair appear on the skin. The hoof terminates in three toes, and one or two horns are attached to the nasal or frontal bone. The Indian rhinoceros is the largest of the genus. It has one horn, and its skin is peculiar for having definite folds. The black rhinoceros is native to South Africa. This species has two horns, and is dreaded more for its ferocity and strength than the lion. Several varieties are found in the islands of Java, Sumatra, and Borneo, all of which are one-horned. The rhinoceroses of Asia are more docile than the African, and have been trained as beasts of draft and burden. Traces of many extinct species are found as early as the Miocene tertiary period.

RHODE ISLAND, one of the original thirteen states of the United States, and the smallest in area. It is bounded on the north and east by Massachusetts, south by the Atlantic, and west by Connecticut. Its length from north to south is about fifty miles, width about forty miles, and area 1,250 square miles, about one-fortieth as large as New York. Rhode Island is located entirely in the Atlantic coast plain, but its surface is somewhat diversified, being hilly in the northern part. It slopes toward the south, and along the Atlantic coast is a level tract. Narragansett Bay penetrates northward about forty miles, forming several islands and affording a total seacoast of about 350 miles. The principal rivers include the Pawcatuck, Pawtucket, and Pawtuxet, all of which furnish excellent water power and are navigable for a short distance. Its climate is similar to that of southern Massachusetts, with a rainfall of about forty-two inches and a mean temperature of 48°.

The minerals consist principally of granite and limestone, the former being used largely for monuments and paving blocks, while nearly the total output of the latter is burned into lime. In some sections the soil is of a sandy character, but most of the surface is quite fertile. The principal cereal crops include corn, oats, rye, and barley. Considerable gardening is carried on for city markets, and the production of potatoes is the most important in the state, the output being valued at about $575,000. Many varieties of hay are produced. The live-stock comprises horses, cattle, sheep, and swine. Poultry is produced in abundance. Formerly the region contained considerable timber, but this has been utilized almost entirely in construction work. Manufacturing is the most important industry of the state, representing a capital of $135,500,000. The output includes cotton and woolen goods, oleomargarine, jewelry, machinery, locomotives, rubber and leather goods, firearms, and tobacco products. Electric car lines connect all the important cities and towns, having a total length of about 260 miles. The state has 525 miles of railroads, which, together with excellent navigation facilities, provide ample transportation conveniences.

The state has a well organized system of common schools, with which are included fifteen public high schools. Many private and secondary schools are maintained, and there are several institutions of higher learning. A soldiers' home is in Bristol. The State Home and School for Children, a state school for the deaf, and the Rhode Island School of Design are in Providence. Ample provisions have been made for training in the industries, and for the care of the unfortunate and incorrigible. Teachers are trained in a state normal school, but normal training is given also in several other institutions. Brown University, one of the leading higher institutions of America, is located at Providence. It has eighty professors and instructors, 900 students, and a library of 105,000 volumes. The state has a large

representation of Christian organizations and scientific associations, and there are published in the state sixty-five periodicals, of which thirty-five are issued weekly and fifteen daily.

It is thought that the Norsemen were the first Europeans to visit Rhode Island. They cruised on its shores in the 10th century. Roger Williams was banished from the Massachusetts Bay colony for attacking its theocratic government, and in 1636 made the first settlement at Providence, where he advocated complete separation of church and state. The followers of Anne Hutchinson founded Portsmouth in 1638, and Newport was settled in 1639. These settlements were organized as one colony under a charter in 1644, but a new charter was granted in 1663, which remained the fundamental law until 1842. The peculiarity of apportionment of representation and a property qualification for voting caused Dorr's Rebellion in 1842, when a new constitution was adopted, which extended the right of suffrage to all male citizens. The state did not ratify the national constitution until 1790; this delay was occasioned by a desire of the agricultural classes to reserve the power to levy import taxes and to retain paper money as legal tender. Its citizens were active supporters of the Revolution, and all other national contests in favor of maintaining the nation. Providence is the capital and principal city. Other cities and towns are Newport, Pawtucket, Woonsocket, Lincoln, Warwick, Johnston, East Providence, Cranston, Central Falls, Cumberland, and Westerly. The state is divided into five counties, and according to the census of 1900 has a population of 428,556. This includes a colored population of 9,506, or 2.21 per cent., of which 366 are Chinese and 9,092 Negroes. The female population is given at 50.9 per cent.

RHODES (rōdz), an island situated southwest of Asia Minor, in the Mediterranean Sea, belonging to Turkey. Its length is about forty miles, greatest width twenty miles, and area 425 square miles. Anciently it was an independent state of Greece, when it was known as Rhodos, and its capital, Rhodes, dates from 404 B. C. It is famous as a maritime city and its neglected harbors were once the seat of vast commercial activity. The city was surrounded by strong walls, and at the entrance of one of its ports stood a great statue of Helios, called the Colossus of Rhodes. This work of art was so remarkable that it became known as one of the seven wonders of the ancient world. Its height was seventy cubits, and it was only one of about 3,000 statues in that city, then a noted center of intellectual and political power. Alexander the Great captured Rhodes and established a powerful garrison there, but at his death, in 323 B. C., the Macedonians were expelled from the island. The Rhodians sided with Cæsar against Pompey, and in 42 B. C. Cassius entered the city and carried off many of its treasures. However, it continued a center of learning for centuries under the emperors of Byzantium. The Knights of St. John of Jerusalem settled on the island in 1310 and until 1565 defended themselves against the Turks, but in the latter year they were compelled to yield. Since then it has been a Turkish possession. The island has a population of about 32,000, of whom fully 25,000 are Greeks.

RHODES, Cecil John, capitalist and statesman, born at Bishop's Stortford, England, July 5, 1853. He descended from a noble family, and his father was for many years vicar of St. Michael's Church, in the Bishop's Stortford parish. After attending a grammar school, he entered Oxford University, and for a time studied law at the London Inner Temple. Soon after he went to South Africa on account of ill health, where he became interested in diamond-mining, and served in the Cape Colony assembly. He was made premier of the colony in 1890, and the following year visited England, where he made a donation of $50,000 to further the Irish home rule movement advocated by Parnell. Shortly after he returned to South Africa to take the field against the native king of Matabeleland, and in 1896 instigated the notorious Jameson raid into the Transvaal, on account of which he resigned as prime minister of Cape Colony. However, he was reëlected to the colonial parliament in 1897, and two years later visited England to plan for a railroad line to ultimately connect Cape Town with Cairo. He is noted as one of the leading British financiers, and one of the most influential citizens in promoting the expansion of English influence in South Africa. In the latter part of 1899 he was among those besieged in Kimberley by the Boers, but early in 1900 the city was relieved. He died March 26, 1902.

RHODESIA (rō-dē′shi-à), an extensive region of South Africa under British influence, comprising about 750,000 square miles. It lies on both sides of the Zambezi River, immediately east of Portuguese West Africa and German Southwest Africa. The southern part of Rhodesia includes Mashonaland and Matabeleland, two regions lying between the Zambezi and Limpopo rivers, and also a part of the Bechuanaland protectorate. Extensive forests of valuable timber abound in the region, and the country yields fruits, cotton, indigo, india-rubber, tobacco, wheat, maize, and oats. A large part of Rhodesia consists of an elevated tableland, which yields valuable grasses, and many different classes of domestic animals are reared there, particularly sheep and cattle. The minerals include gold, silver, copper, tin, iron, plumbago, and coal. Gold was first discovered there in 1898, and the mines are remarkable for their productiveness. It has been asserted that some of the ancient mines of Ophir, from which King Solomon obtained

supplies, were in Rhodesia. Railroads have been constructed into Rhodesia from Kimberley, and many miles of highways, telegraph lines, and other valuable improvements have been made. Salisbury, in Mashonaland, is the capital of Rhodesia; and Buluwayo, in Matabeleland, is the most important commercial center. The projected railroad from Cape Town to Cairo is located through Rhodesia, and the line now extends to a distance of about 1,500 miles from the Cape. Rhodesia has an estimated population of 2,500,000.

RHODODENDRON (rō-dō-dĕn'drŏn), an extensive genus of shrubs of the heath family. The leaves are usually alternate and evergreen in some species, and the flowers are in clusters and often variously colored. Many varieties are cultivated for ornament in the United States, where they are found in abundance in the native state in the Alleghany Mountains. Several species are native to Japan, China, Australia, and South America. Various American species have been naturalized in Europe, where they are cultivated extensively in gardens and parks as flowering plants. Some varieties abound in the Alps, and they are known among the

RHODODENDRON.

Germans as Alpine roses. The great rhododendron is found in abundance in some of the southern states. It is from ten to twenty feet high.

RHONE (rōn), a river of France, which rises in Switzerland, twenty miles southwest of the source of the Vorder Rhein. Its beginning is in the Rhone glacier, about 5,585 feet above sea-level. From Lake Geneva, through which it passes, it has a general southwesterly course to Lyons, where it makes a bold turn toward the south and enters the Gulf of Lyons by an extensive delta. Its length is 500 miles, the basin has an area of 37,500 square miles, and 350 miles of its course are navigable. The Saone, Ain, Isere, and Durance are its principal tributaries. It is connected by canal with the Rhine, Loire, Seine, and Meuse rivers.

RHUBARB (rū'bärb), a genus of plants cultivated for medicinal use and as a food. About twenty species have been described. The stems are erect and thick, often from five to seven feet high, and bear a cluster of seeds at the upper end. The roots are fleshy, and the leaf-stalks, when young and tender, are used for pies, tarts, preserves,

RHUBARB.

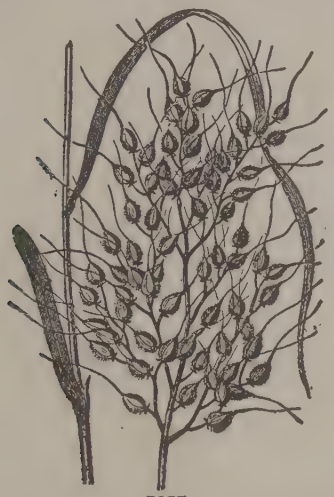
and a kind of wine. In many countries the rhubarb is cultivated chiefly for its roots, owing to their medicinal properties. Rhubarb as a medicine is slightly astringent when given in small doses, and in large doses acts as a purgative. It is used mostly in treating jaundice, catarrh of the biliary duct, and for certain skin diseases. The plant is cultivated for medicine in China and Russia, and for food in the United States and nearly all countries having a temperate climate.

RIBBON, the name originally applied to an article of ornament, but it is now employed to designate various products used in binding and tying articles of dress and for symbolical purposes. It is properly a narrow band of woven silk from less than an inch to not more than nine inches in width, but other materials are used extensively for the cheaper grades. The principal ribbons include satin, a smooth surface; grosgrain, a ribbed surface, and plush, a velvety surface. However, there are many varieties of each, differing in composition, weaving, and coloring. Crefeld is the center of ribbon manufacture of Germany; Vienna, of Austria; Basel, of Switzerland; Etienne, of France, and Coventry, of England. The ribbon trade of America and Europe aggregates annually about $95,000,000.

RICARDO (re-kar'do), **David**, economist and statesman, born in London, England, April 19, 1772; died Sept. 11, 1823. He descended from Jewish parents, and engaged with his father as a stock broker. The two became alienated because the son married a Christian and held to the Christian faith, but young Ricardo established himself as a stock broker, realizing a large fortune by careful devotion to business investments. In 1818 he became a member of parliament, and retained his seat until his death. He was a student of geology, chemistry, and political economy, and published a number of excellent works and a series of contributions to the "Morning Chronicle." His most

noteworthy publication is "High Price of Bullion a Proof of the Depreciation of Bank Notes," which appeared in 1809. In this he urged the need of a metallic basis for the national currency, and soon after followed with a publication entitled "Plan for a National Bank." Other publications are "Principles of Political Economy and Taxation;" "Protection to Agriculture," and "Influence of Low Prices of Corn on the Profits of Stock."

RICE, an annual cereal plant native to India, but now extensively naturalized and cultivated for its seed. Various writers



RICE.

assert that rice was cultivated in China about 2822 B. C.; in the Euphrates valley about 400 B. C., and near Pisa, Italy, as early as 468 A. D. It constitutes one of the most important foods, and is used more extensively than any other food-stuff by the people of the world, being the principal food of nearly one-third of the human race. Several thousand species have been enumerated, all depending somewhat on soil and climate. Some are grown on upland, but most of the rice sold in the market is tilled on marshy or inundated land, as in the swamps of the Carolinas, Louisiana, and Texas, and in the Nile and Niger valleys. The seed is sown like oats or wheat, after which the ground is flooded till it germinates, when the water is drawn off, but it is flooded a second time to kill the weeds, and a third time when about to head. In most regions the height of the plant depends principally on the depth of the water, as the ear always grows above the surface, and the grain is produced in heads similar to oats. The water is drawn off shortly before the grain ripens, and the crop is cut with reapers and threshed by machines much like oats and wheat. The rice grain is covered with a husk when coming from the threshing machine, but this is afterward taken off in a mill before the rice is put on the market. Several grades of rice result in the process of removing the husk on account of some grains being broken, but all of these are separated and sold as different classes of rice. The plan of cultivation and treatment varies somewhat in different countries, but in all cases moisture and a warm climate are quite essential to the production of the better grades. The finest quality in the world is produced in Georgia and the Carolinas. Rice is chiefly a farinaceous food, and contains only about seven per cent. of gluten. It is best for the system when eaten with milk or fatty substances.

RICHARD I., king of England, surnamed the Lion-Hearted, born at Oxford, England, Sept. 8, 1157; slain March 26, 1199. He was the third son of Henry II. and his queen, Eleanor, and on July 6, 1189, succeeded his father on the throne. During his early life he was the cause of a long quarrel in the family of his father, and in 1184 sided with the king of France in a war against England. Shortly after ascending the English throne, he organized a large army and took part in the third Crusade for the conquest of the Holy Land. His army joined the forces of Philip of France at Vezelai, whence the allied army of 100,000 men marched to Lyons, where they separated, but afterward met at Messina. Richard next sailed to Sicily, then to Cyprus, and on June 4, 1191, joined the Crusaders at Acre. This fortress had been besieged nearly two years, but soon after the arrival of Richard it surrendered, and he immediately began his march upon Jerusalem, but never ventured to make an attack upon the city. He accomplished nothing aside from the capture of Acre, and after concluding a truce of three years with Saladin, commander of the Saracens, sailed for home, but was wrecked in the Adriatic Sea. Fearing discovery in Austria by his enemy, Duke Leopold, he undertook to pass through that country in disguise, but was discovered and surrendered to Henry VI., emperor of Germany. He was at length liberated after imprisonment at Trifels and Worms, and in 1194 returned to England. Soon after he engaged in a war against Philip of France, in which he was killed.

RICHARD II., king of England, son of Edward the Black Prince, born at Bordeaux, France, April 13, 1366; died at Langley, Scotland, Feb. 14, 1400. He succeeded his grandfather, Edward III., on the throne of England in 1377. As he was a minor, the government was vested in a council of twelve, but his uncle, John of Gaunt, was excluded from the council. Excessive taxation and various abuses led to a peasants' revolt in 1381, which was headed by Wat Tyler, and in the factional contentions that followed the young king showed considerable boldness and presence of mind. In 1382 he married Anne of Bohemia, daughter of Emperor

Charles IV., and in 1385 ended the war with France only to take up arms against Scotland. He declared his majority in 1389, thus freeing himself from the dictation of the council, but the weak king soon let the reins of government pass to the duke of York, though the country enjoyed several years of peace and a fair degree of prosperity. However, the queen died in 1394, and he soon after married Isabella of France. In 1397 he became entangled in a quarrel with Warwick, Gloucester, and Arundel, and when parliament met all were declared guilty of treason. This resulted in the execution of Arundel, while Warwick was banished, and Gloucester died from violence in prison. On the death of John of Gaunt, in 1399, Richard seized the Lancaster estates, and this unjust act became the occasion of his downfall. While the king was in Ireland, the duke of Hereford organized a force to regain the Lancaster estates, and succeeded in raising sufficient military power to force the king into submission on his return to England. Parliament, in 1399, deposed him, and on Sept. 29 he executed a deed resigning the crown to Henry. Though at first liberated, a month later Richard was sentenced to life imprisonment at Pontefract Castle. A conspiracy was discovered, in 1400, against Henry IV., in which Richard was implicated, and his death soon after in prison is thought to have resulted from violence.

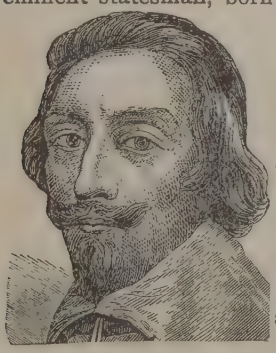
RICHARD III., king of England, last of the Plantagenet dynasty, born at Fotheringay, England, Oct. 2, 1452; died in battle at Bosworth, Aug. 21, 1485. He was the youngest son of Richard, duke of York, and brother of Edward IV. The latter succeeded his father as king of England in 1460, and soon after created Richard duke of Gloucester and made him lord high admiral, in which capacity he served the king with much fidelity. He married Anne, daughter of the earl of Warwick, in 1473, and in 1482 led an army into Scotland against James III. Edward IV. died in 1483, and left Richard as guardian to his son Edward V., then a youth of only thirteen years. However, Richard at once began to make plans with the view of acquiring the throne of England, and accordingly placed Edward V. and his younger brother in the Tower, while he had himself proclaimed king of England. The people soon organized a formidable insurrection against him, but he suppressed the uprising and executed the leaders. About the same time the two royal children were cruelly murdered in the Tower, it is thought with the knowledge of Richard. His reign was characterized by much cruelty and crime, which soon disgusted the people, and in 1485 Henry of Richmond landed in England as his rival for the throne. The two met in battle at Bosworth, where Richard was slain. This battle decided the War of the Roses, and placed the house of Lancaster in power.

RICHARDSON (rĭch'ȧrd-sȯn), **Henry Hobson**, architect, born in Priestley's Point, Louisiana, Sept. 29, 1838; died April 28, 1886. After graduating at Harvard University in 1859, he studied architecture in Paris till 1865, when he returned to the United States and became a member of the firm of Gambrill and Richardson in New York City. Richardson may be said to have originated a particular style of architecture, possessing elements of strength and refinement. It was his disposition to produce effect by mass rather than elaboration of decoration. Among the noteworthy structures planned by him are the Battle Street Church, Boston; the Trinity Church in the same city, built on the style of the Provençal cathedrals; and several halls at Harvard University. He was employed for several years as one of the architects on the state capitol building at Albany, New York. Richardson was a man of much intelligence and fascinating manners.

RICHARDSON, Samuel, eminent novelist, born in Derbyshire, England, in 1689; died in London, July 4, 1761. He was the son of a carpenter, and at fifteen years went to London as an apprenticed printer, where he later established an office on his own account. He was known from his youth as a fluent letter writer, but he did not engage in literary work until about fifty years old, when he became the discoverer of a new literary form by accident. This occurred when a London firm wished to publish a series of model letters as a guide for letter writers, and he was selected as a suitable person to prepare such a work. However, he conceived the idea of making the letters tell a connected story, and selected a country girl to represent the heroine, naming his production "Pamela, or Virtue Rewarded." This work was received with such favor that a large number of editions were issued, and his second novel, entitled "History of Clarissa Harlowe," appeared in 1749. The latter work is generally regarded his masterpiece. It is the tragic story of a young lady who falls a victim to a man of splendid talent and attraction, but of infamous character. A few years later he published "History of Sir Charles Grandison," in which he sought to portray the type of a true man, but it is quite evident that he was more successful in the delineation of women than of men. In these three works Richardson dealt with three different orders in the social scale. "Pamela" dealt with the low; "Clarissa Harlowe," with the middle class of society; while in "Sir Charles Grandison" he intended to represent an ideal hero, who would combine the graces and accomplishments of the man of fashion with the perfection of educational and religious culture. In 1754 he became printer of the journals of the house of commons. Among his writings not named above is an edition of "Æsop's Fables."

RICHARDSON, William Adams, jurist and statesman, born in Tyngsboro, Mass., Nov. 2, 1821; died in Washington, D. C., Oct. 19, 1896. In 1846 he graduated from Harvard University, where he studied law and was admitted to the bar at Boston. He soon rose as a prominent member of the bar, became judge of probate for Middlesex county in 1856, and in 1869 was appointed assistant secretary of the treasury by President Grant. In 1873 he became secretary of the treasury, transferring shortly after the Geneva award of $15,500,000 from London to Washington, but resigned in 1874 to become judge of the court of claims. President Arthur appointed him chief justice of the court of claims in 1885. He served as trustee of Harvard and lecturer on law in the Georgetown University, D. C. His publications include "Banking Laws of Massachusetts;" "History of the Court of Claims," and "National Banking Laws."

RICHELIEU (rĕsh'ẹh-loo), **Armand Jean du Plessis, Cardinal, Duke of**, eminent statesman, born in Paris, France, Sept. 5, 1585; died Dec. 4, 1642. He descended from a noble family and studied for a military career at the College of Navarre, but his elder brother, being bishop of Luçon, influenced him to study for the church. Accordingly he attained a degree at the Sorbonne, and in 1607 succeeded his brother as bishop of Luçon, being consecrated to that position by Cardinal de Givry in the presence of Pope Paul V. Louis XIII. of France appointed him secretary of war and foreign affairs in 1616, but the following year Louis quarreled with the queen-mother and Richelieu was banished to Blois and later to Avignon. A reconciliation was effected soon after and the queen was restored to her position at court, Richelieu gaining marked influence. He was made cardinal in 1622, and became minister of state in 1624, a position which he retained until his death. It was Richelieu's design to strengthen the French court, and with that end in view he devised a plan whereby the nobles and feudal lords were limited in power, many of the leading opponents being sentenced to life imprisonment or brought to the scaffold. This fairly begun, he began to plan with the view of weakening the house of Hapsburg, both in Germany and Italy. The suppression of the Huguenots was also one of his designs, and when their influence became limited, he turned against the queen-mother, Mary of Medici, for the reason that she had conspired to cause his fall, whereupon she was compelled to withdraw into exile at Cologne. Richelieu was signally successful in carrying out his vigorous policy, both at home and abroad. He made his administration quite impressive by promoting many internal improvements and gigantic military maneuvers. As a statesman he attained to much eminence, giving the royal house freedom from the influence of the nobilty. He patronized learning, and is the founder of the French Academy and the Royal Printing Presses. In 1631 he was raised to the rank of duke. He is the author of several works on economics, civics, and diplomacy.



RICHELIEU.

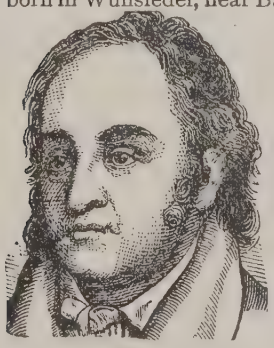
RICHMOND (rĭch'mọnd), a city of Indiana, county seat of Wayne county, sixty-five miles east of Indianapolis. It is situated in the eastern part of the state, has excellent railroad facilities, and is surrounded by a rich farming and dairying country. Among the manufactures are flour, engines, boilers, farming implements, earthenware, and furniture. The city is supplied with electric lights and street railways. It has excellent schools, libraries containing about 30,000 volumes, and is the seat of Earlham College, a co-educational institution founded by the Quakers in 1859. It is the seat of a fine courthouse, several county buildings, and a state insane asylum. Population, 1900, 18,226.

RICHMOND, the capital of Virginia, in Henrico county, on the James River, ninety-five miles southwest of Washington. The city is the focus of numerous important railroad lines, has steamboat connections with New York and Philadelphia, and enjoys a large manufacturing and commercial trade. An immense quantity of water power is supplied by the James River for various manufacturing enterprises, which represent an aggregate capital of $10,500,000. Among the principal manufactures are tobacco products, boots and shoes, flour, machinery, hardware, cotton and woolen goods, and farming implements. The city has street railways, electric and gas lights, street pavements, several parks, and libraries containing about 65,000 volumes. It is the seat of Richmond College, a Baptist institution founded in 1832, and a number of other institutions, hospitals, and schools. In Richmond are excellent monuments to Robert E. Lee and W. C. Wickam, and statues of Patrick Henry, Thomas Jefferson, Thomas Nelson, Andrew Lewis, John Marshall, George Mason, and other eminent Virginians. The city was founded in 1709, became the capital of Virginia in 1779, and in 1861 was selected as the capital of the Confederate States. Richmond was an objective point of the Union army in the Civil War, but was not evacuated by Lee until April 2, 1865, when General Grant took possession. It ranks as the forty-sixth city of the United States. Population, 1900, 85,050.

RICHMOND, Leigh, clergyman and author, born in Liverpool, England, Jan. 29, 1772; died May 8, 1827. He was the son of a physician, graduated from Cambridge in 1784, and soon after became curate of Brading in the Isle of Wight. Later he secured an appointment as chaplain to the Locke Hospital in London, but in 1805 became rector of Turvey, Bedfordshire, a position he held till his death. Richmond is noted as a prominent supporter of the British and Foreign Bible Society, and the author of "Dairyman's Daughter," a work translated into twenty different languages. Other writings are "Young Cottager" and "Negro Servant." In 1814 his writings were collected and published under the title of "Annals of the Poor."

RICHTER (rĭk'tẽr), **Hans,** German musician, born in Raab, Hungary, April 4, 1843. His father held an important position in the cathedral of Raab at the time young Richter was born. He entered the Conservatorium in Vienna in 1859, where he played the horn in the orchestra of the Kärnthnerthor Opera. He was made conductor of the National Theater in Munich in 1868, of the National Theater at Pesth in 1871, and of the Court Opera Theater in Vienna in 1875, which position he held until 1898. In the latter year he became conductor of the Manchester Philharmonic Society. Richter played in many of the leading cities of Europe, and may be considered one of the most eminent orchestra conductors of the early part of the twentieth century. He is the most eminent authority on Wagner and Beethoven of recent times.

RICHTER, Johann Paul Friedrich, usually called Jean Paul, noted author, born in Wunsiedel, near Baireuth, Germany, March 21, 1763; died Nov. 24, 1825. His father was a school teacher, and died while the son was attending the gymnasium at Hof. He entered the University of Leipsic in 1780 to study theology, but there became deeply interested in literature and the sciences. Poverty caused him to leave the university in 1784, when he returned to live with his widowed mother at Hof, and engaged as private tutor to teach the children of several wealthy families. In the meantime he published his first composition, "Praise of Folly," but his writings were not favorably received until 1793, when he published "Invisible Lodge," a romance relating to experiences in the life of a school teacher. From that time his success was assured, and his books became the most widely read in Germany.



JEAN PAUL RICHTER.

In 1801 Richter married Caroline Mayer, daughter of Professor Mayer of Berlin, and the two spent some years in travel, visiting Goethe, Schiller, Wieland, and Gleim. He settled at Baireuth, in Bavaria, in 1804, where his time was spent in great industry and marked domestic happiness. In his later years he became afflicted with total blindness, and the death of his son, Max, in 1821, weighed heavily upon him. Richter is the author of a number of works written in a deeply reflective style, but in many of them he mingled rare humor, and was able to describe scenes from nature with remarkable accuracy and ease. Few writers are more really poetic in their prose writings, and none outrank him in originality and interest. Among his writings not named above are "Hesperus;" "Flower, Fruit, and Thorn;" "Dream of the Dead Christ;" "Parson in Jubilee;" "Biographical Recreations Under the Cranium of a Giantess;" "Titan;" "Wild Oats" (Flegel Jahre); "Life of Quintus Fixlein;" "Levana, or Rules of Culture," and "Rules of Æsthetics."

RICKETTS, James Brewerton, soldier, born in New York City, June 21, 1817; died in Washington, D. C., Sept. 22, 1887. After graduating from the West Point Military Academy in 1839, he served on the frontiers, and at the beginning of the Mexican War accompanied the American army, serving in several important battles. He was made brigadier-general of volunteers in 1861. He served with the army of the Potomac till the surrender of Lee, and took part in the battles of Bull Run, South Mountain, Antietam, the Wilderness, and the siege of Petersburg. In 1867 he retired from the army with the rank of major-general. He served on courts-martial from that time until January, 1869.

RIDDLE, a proposition or question put in obscure terms to excite curiosity and exercise the ingenuity in discovering its meaning. Riddles may be regarded fables put in the form of questions, and like them they originated with primitive people. They have been perpetuated in the folk-lore of the peasants. In ancient times fables were used to enhance investigation and to exercise at least some degree of influence in disciplining the mind. This is illustrated by the mythology of Greece and many of the sacred writings, of which the riddles proposed by Samson to the Philistines and those attributed by Josephus to Solomon are good examples. In the Middle Ages there was a marked disposition to construct and propound riddles as a pastime or for intellectual exercise, but the practice was limited greatly by the Reformation, and has now gone entirely out of use in the more highly civilized countries. A tendency to use riddle-making as a merry pastime still prevails in some of the countries of western

Asia, and a number of books on riddles have been published; the most noted collection is the German work published in 1883, known as "Ohnesorgen's Sphinx." An example quoted here will, perhaps, serve as an illustration, namely: "What is the worst bestowed charity one can give?" Answer: "Alms to a blind man; for he would be glad to see the person hanged who gave it to him."

RIDLEY, Nicholas, noted leader of the Reformation, born at Wilmotswick, England, about 1500; suffered martyrdom Oct. 16, 1555. After attending the grammar school of Newcastle-upon-Tyne, he entered Cambridge University, where he was ordained priest in 1524. The spirit of the Reformation had already spread in various parts of England, but he was more forcibly imbued with the new doctrines by spending three years in France, after which he returned to England and arduously taught the reformed faith. In 1530 he became under-treasurer of Cambridge University, and shortly after signed the decree of that institution against papal jurisdiction in England. He was appointed king's chaplain in 1540, elected master of Pembroke College, Cambridge, the same year, and in 1545 became a canon of Westminster. In 1552 he visited Princess Mary at Hunsdon, but, failing to persuade her to leave the Catholic faith, he concurred in the proposals to exclude her from the throne, giving his support to Lady Jane Grey instead. Soon after the death of Edward VI. he delivered a sermon at St. Paul's Cross in opposition to Mary, declaring her illegitimate and predicting her ascension detrimental to England. He was arrested shortly after in accordance with the proclamation issued by Mary and committed to the Tower. Cardinal Pole named a commission to try Ridley for heresy, and in March, 1554, he was found guilty and sentenced to death. Efforts were made to cause him to recant, but he remained steadfast and along with Latimer was burned at the stake in Oxford.

RIDPATH (rĭd'păth), **John Clark**, educator and author, born in Putnam county, Indiana, April 26, 1840; died in New York City, Sept. 30, 1900. He first attended the common schools, but in 1859 entered De Pauw University, from which he graduated with honors. After serving as principal of the Thorntown Academy, he became professor in Baker University, Kansas, in 1867, and in 1869 was called to the chair of English literature in De Pauw University. Later he became professor of history and political philosophy, and in 1879 was made vice-president of the institution. During this period he succeeded in raising the university endowment to $2,000,000, and in 1885 resigned to devote his whole time to literature. His first book appeared in 1875, entitled "Academic History of the United States," and the following year he published his "Popular History of the United States." He contributed to many magazines, and was for a time editor of the "Arena," of Boston. In 1896 he ran for congress on the democratic ticket in his home district in Indiana, and was defeated by a small majority. "Great Races of Mankind" is one of his leading works, on which he was engaged for ten years in preparing the material and four years in writing the work. Other publications include "Life and Work of Garfield;" "Life and Times of Gladstone;" "Life and Work of James G. Blaine;" "History of all Nations," and "Cyclopædia of Universal History." He edited "Universal Literature."

RIENZI (re-en'zee), **Nicola Gabrini**, eminent statesman, born in Rome, Italy, in 1313; died Oct. 8, 1354. He descended from humble parents, but was endowed by nature with remarkable power of oratory, and secured the advantages of a liberal education, including instruction in rhetoric, history, philosophy, and poetry. His ambition to free Rome from the thraldom of the nobles was first excited when his younger brother was assassinated by a Roman nobleman, and he was even more aroused because punishment of the offender was impossible. In 1343 he joined Petrarch and visited the court of Pope Clement VI. at Avignon, where he presented the tyranny of the nobles in a remarkable oration. It was through the effort of Petrarch that Rienzi was given a favorable hearing, and subsequently he received an appointment as notary to the chamber of Rome. For three years he advocated reform without avail, but in 1347 he took advantage of the governor's absence from the capital and successfully planned a revolution. The first step was to hold an assembly of his friends on Mount Aventine, where he proposed a plan of government that he called the Good Estate, and induced them to subscribe an oath in support of it. With a hundred horsemen and the support of the pope's legate he made his way to the capitol, where the title of tribune was conferred upon him by the people. The common people having attained an easy triumph, he banished a number of the nobles from Rome, and amid great rejoicings the proclamation went forth that the Eternal City would again revive its former glory and power. At first successful, he was confirmed in authority by the pope, but the powerful nobles still opposed him bitterly, while the necessary taxes for the support of the government excited opposition among the common classes.

In 1348 Rienzi was compelled to withdraw from Rome after a reign of seven months. He fled to Naples and afterward spent several years with the Franciscans in the Apennines. He ventured a second time to attempt the deliverance of Rome by applying, in 1350, to Charles IV., emperor of Germany, for assistance, but that sovereign was unfavorably impressed with his schemes of

revolution and delivered him to Pope Clement as a prisoner, who held him captive for three years. Innocent VI. not only released him, but decided to assist Rienzi in crushing the Roman nobles, hoping thereby to rid himself of a demagogue named Boroncelli. Rienzi immediately raised a large body of soldiers and made a triumphal entry into Rome, where much rejoicing was occasioned by his return. However, the barons opposed him by fortifying themselves in their castles, and he abandoned public concern for good living. His administration was attended by many disturbances, and after a rule of two months he was attacked at the capitol by a crowd of people and put to death under great indignities.

RIESENGEBIRGE (rē′zẹn-gẹ̄-beerg′ẹ), or **Giant Mountains**, a mountain group of Europe, situated between the upper courses of the Elbe and Oder. It forms the boundary between Germany and Bohemia. The range covers an area of 425 square miles, most of which is in Austria. Schneekoppe is the culminating peak and the loftiest mountain in southeastern Germany; height, 5,260 feet. Iron, granite, and metamorphic slate are abundant in these mountains.

RIFLE, the name of any firearm that has grooves in the surface of the bore, but usually the name is applied only to the arm that has superseded the musket. The firearms that were made originally for hand use consisted of long tubes without any lock, and were fired by means of a slow-match or a live coal. They were at first laid on a wall or wooden frame, but later a handle was added for holding them up against the arm. It was found soon after that the smooth bore in the barrel was not conducive to good results, since not only a part of the explosive force of the powder was lost, but there was also a downward pressure in the barrel which tended to cause the ball to move forward in a direction different from that indicated by the barrel. Hence, it was not possible to shoot with accuracy at any great distance. The first improvement was made in the 15th century by providing straight grooves, but in 1520 Augustus Koster, of Nuremberg, Germany, found by experimenting that a spiral groove imparts rotation to the projectile and increases the accuracy of the weapon. Since then the barrels have been rifled in that manner; the number of grooves and twist of the spiral vary according to the intended use. The rapidity with which the bullet revolves depends entirely upon the character of the twist in the spiral and the force of the explosion; the effect of the revolution is to cause the ball to move forward in a line with the barrel. In this the ball is subject only to the force of gravity, by which it is eventually brought to the ground.

It is to be observed that there is a difference between the balls formerly used and those now generally employed, in that the former were round, while the latter are elongated. These came into use in 1851, and are the invention of Captain Minié of the French army, who is the inventor of a rifle that bears his name. The bullets first used by him had a hollow base, and the explosion of the powder caused them to expand and take on a form at the surface resembling the inner mold of the gun. There were some advantages in this particular gun, but its heavy weight caused it to be discarded for the Enfield rifle in 1853. This rifle was lightened materially by reducing the bore to .58 of an inch in diameter. The Enfield rifle was used in the British army till 1865, when it was converted into a breech-loading firearm by attaching to it a breech-loading mechanism. The United States adopted the Springfield rifle, a firearm with a caliber of .58 inches, in 1855, which was used to a considerable extent throughout the Civil War, though a large number of Enfield rifles were employed. A short time before the Franco-German War of 1870-71 the German army was supplied with the celebrated needle rifle, which was the first arm of this kind to acquire a reputation in warfare. It proved an efficient aid in the military contest so detrimental to France.

Rifles used at present by the leading nations are not only grooved spirally, but are breech-loading and repeating. Though the repeating rifle is not new, it has been improved within recent years. The Spencer rifle was among the first of the repeating kind, and has a supply of cartridges in the stock of the arm, while the Winchester has a tube under the barrel. All the newer rifles designed for rapid firing have a quantity of cartridges in a detachable magazine, which may be replaced as soon as emptied by one filled with a new supply of cartridges. The German Mauser-Mannlicher is a typical repeater of modern make. The cartridges are issued in packages of five, and placed in a tin or sheet-iron loading case. A magazine just in front of the trigger receives the case through an opening. When adjusted, the top cartridge is in position to be pushed into the chamber of the gun by a forward motion of a bolt. A spring presses and holds the case in position as long as any cartridges remain, but when the last cartridge is pushed out by the bolt, the case drops through by its own weight, and is then replaced by another. Various other rifles are made somewhat differently, but in effect they produce practically the same results. The United States adopted the Krag-Jorgensen, a rifle of German manufacture, in 1896, which is also used by Norway, Denmark, and several other countries. The Mauser-Mannlicher is used in Germany; the Lee-Metford in England; the Mannlicher in Austria and Holland; the Mauser in Belgium, Spain, and Sweden; the Lebel in France and Turkey; the Mauzin in Russia, and the Schmidt in Switzerland. Rifles employed

in warfare have a much longer barrel than those used for sporting, since for the latter purpose long range and powerful penetration are not desired.

RIGA (rē'gą), an important seaport of Russia, capital of the government of Livonia, on the Duna River, six miles from the Gulf of Riga. It is connected with other trade emporiums by railroads, has well paved streets, and is the seat of an excellent cathedral. The streets are broad except in the older part, and all are lighted by gas and electricity. It has an extensive system of rapid transit and numerous monuments and parks. The government maintains a number of hospitals and public schools, and there are public buildings of importance, including the governor's residence. Among the manufactures are cotton and woolen goods, leather, soap, starch, machinery, pottery, and tobacco products. It has a large trade in lumber, cereals, and live-stock. Riga was founded in 1201 and was long an important member of the Hanseatic League. It was annexed to Poland in 1561, but became a Swedish possession in 1621 under Gustavus Adolphus. Since 1710 it has been a part of Russia. More than half the people are Germans. Population, 256,928.

RIGA, Gulf of, an inlet from the Baltic Sea, in the western part of Russia. It is about one hundred miles long, sixty-five miles wide, and at its entrance is the island of Ozel. It receives the water of the Duna River.

RIGGS, Elias, missionary, born in New Providence, New Jersey, Nov. 19, 1810; died Jan. 20, 1901. He graduated from Amherst College in 1829, attended Andover Seminary, and in 1832 went as a missonary to Athens, Greece, under the American Board of Missions. After several years of successful work in the vicinity of Athens, he located in Smyrna, Asia Minor, and in 1853 was transferred to Constantinople. In the meantime he aided in revising the translation of the Bible into the Bulgarian and Turkish languages, and in 1857 came to New York to publish his own translation of the Bible into the Armenian language. While in America he lectured in the Union Theological Seminary, but soon returned to his field of labor in Eurasia. His published works include "Grammar of the Modern Armenian Language;" "Manual of the Chaldee Language;" "Grammar of the Bulgarian Language;" "Bulgarian Bible Dictionary;" "Grammar of the Turkish Language," and "Dictionary of Modern Armenian."

RIGGS, Stephen R., missionary, born in Steubenville, Ohio, March 23, 1812; died Aug. 24, 1883. He labored for many years under the direction of the American Board of Missions, particularly among the Dakota Indians. In 1862 he was compelled to withdraw to Fort Snelling on account of the Sioux War, and became chaplain in the expedition sent by the government against them soon after. Beloit College conferred a divinity degree upon him in 1872. Besides aiding in translating the Bible into the language of the Dakotas, he published "Grammar and Dictionary of the Dakota Language."

RIGI (rē'gē), or **Righi,** a noted mountain of Switzerland, located between Lakes Zug and Lucerne, in the canton of Schwyz. It is 5,910 feet high, and is one of the most scenic and beautiful of Switzerland.

RILEY, James Whitcomb, American poet, born in Greenfield, Indiana, in 1852. His father was a successful business man of Greenfield, and intended to have the son study for a profession, but he tired of his studies and became a sign-painter. Later he joined a theatrical company, with which he traveled, and in the meantime gave attention to preparing comic songs and revising plays. He began contributing both prose and verse to periodicals in 1875, and soon after engaged with the Indianapolis "Journal" as a regular writer. After several years he located in Greenfield, where he devoted his entire time to literary work, both as a writer of poems and as a public reader. The writings of Riley are quite various, including many in the hoosier dialect, while others are sentimental, tender, and prosaic. Few recent writers have been able to touch the popular taste so successfully, a fact evidenced by the large sale of his books and the great demand made upon him as a public reader. His works include "Afterwhiles;" "Old Swimmin' Hole;" "Green Fields and Running Brooks;" "Pipes o' Pan at Zekesbury;" "Boss Girl;" "Poems at Home;" "Character Sketches and Poems;" "Child World;" "Rhymes of Childhood," and "Neighborly Poems."

JAMES WHITCOMB RILEY.

RIMINI (rē'mē-nē), a city of Italy, on the Adriatic Sea, seventy miles southeast of Bologna, with which it is connected by a railroad. It is located on a fertile plain, on the banks of the Marecchia River, and contains a large number of monuments and historic buildings, among them a cathedral adorned with sarcophagi. Among the manufactures are wine, glass, sailcloth, clothing, and pottery. It has a considerable trade in agricultural products and merchandise. The city has several excellent hospitals, a number of schools, and a public library of 30,000 volumes. About ten miles northwest of the city is a monumental pillar to mark the spot where Cæsar stood at the time he addressed his army shortly before

he crossed the Rubicon. Rimini had an unimportant history during the Middle Ages. It was attacked successively by barbarians, but for some time was important as an independent republic, its independence ending when Charlemagne annexed it to the papal territory. The independence of Italy and the construction of its railroad have given it a new era of prosperity. Population, 40,195.

RINEHART (rīn'härt), **William Henry**, sculptor, born in Carroll county, Maryland, Sept. 13, 1825; died in Rome, Italy, Oct. 28, 1874. He was the son of a farmer, and spent his boyhood in assisting at farm work and attending public school. Later he worked at stone cutting in the neighborhood. He went to Baltimore in 1846 as an apprenticed marble worker, and afterward studied in the Maryland Institute. His success caused him to be placed at the head of the ornamental department in a

RING OUZEL.

marble-yard, and in 1855 he went to Italy to study sculpture and come in touch with Italian art, settling while there in Florence. After receiving instruction for two years, he returned to Baltimore, and brought with him two bas-reliefs made while abroad, entitled "Night" and "Morning." He was employed by the government to execute a fountain figure for the post office in Washington, and the two figures that support the clock in the house of representatives—"Indian" and "Backwoodsman." After remaining a few years in America, he settled permanently in Rome, where he continued working at his art until his death. Rinehart was an artist of superior talent, and was philanthropic, leaving a fund of $45,000 to aid art students. His works include a statue of Chief Justice Taney, in Annapolis, Maryland; "Latona and her Children," in the Corcoran Gallery, Washington; and "Love Reconciled with Death," in the Greenmount Cemetery, Baltimore. Other productions embrace "Woman of Samaria;" "Clytie," and "Rebecca."

RING OUZEL, a species of thrush native to Eurasia, which resembles in size and appearance the blackbird. It is migratory, moving far northward in Europe and Asia in the spring, and passing to the Mediterranean region and Africa in the fall. A crescent of white extends across the lower part of the neck, while the general color of the male is blackish and of the female a dark brown. These birds do damage to cherries and other small fruits when ripe, but they also feed on insects and worms. Their nests are built in a clever manner of clay and grass, and usually from four to six eggs are laid. After the young are reared, they generally gather in flocks.

RINGWORM, a skin disease that appears in the form of circular patches. It is caused by a microscopic fungus parasite. The parasite preys upon the epithelial coverings of the skin, chiefly on the scalp, but also on the body. In men it affects the skin in the vicinity of the beard, especially on the chin and lower lip. It is both chronic and contagious. The best treatment consists in removing the hair and applying sulphurous acid, iodine, or glycerine.

RIO DE JANEIRO (rē'ō dā zhä-nā'ē-rō), capital and metropolis of Brazil, on the southeast coast, seventy-five miles southwest of Cape Frio. It stands on the west shore of the Bay of Rio de Janeiro, in which it has a magnificent harbor, one of the most beautiful and secure in the world. Its site along the bay is level, but it stretches westward over the slopes of low hills, and presents an appearance of remarkable beauty when viewed from the sea. The streets are well platted, though only a few have first-class pavements, while many of the buildings are small and of inferior architecture. Within recent years modern facilities have been supplied, such as telephones, electric and gas lights, and rapid transit, but the city has been long noted for its beautiful gardens and parks, waterworks, and churches. Among the most noteworthy buildings are the capitol, the national museum, and the cathedral. It has numerous asylums, hospitals, and educational institutions. The College of Pedro II. was founded in 1837, and other institutions of learning include the Imperial Academy of Medicine, the National Educational Museum, and the Polytechnic Institute. It has several military, naval, art, and normal schools. The national library has 125,000 volumes and is open to the public. Another noteworthy feature of the city is its excellent water supply, and there are numerous fountains in the streets and public squares. Many of the public places are ornamented with statues and monuments.

The Bay of Rio de Janeiro was discovered in 1555 by the French, who formed a small settlement on the present site of the city, but it fell into the hands of the Portuguese in 1567. Since that time there has been a constant growth, and Rio de Janeiro has always ranked as the most important trade

center of Brazil. It is not only the chief military arsenal and political center of the republic, but it has fully one-half of the export and import trade of the country. Its export trade consists largely of coffee, lumber, and minerals, and is estimated at a value of $60,000,000 annually. The imports include mostly manufactured articles, though local enterprises are rapidly stimulating home production. Among the manufactures are furniture, tobacco products, cotton and woolen goods, metalware, glass, paper, pottery, and leather. A railroad line connects the city with the interior, and there are railroad facilities at Nitheroy, on the opposite side of the bay, with which Rio de Janeiro is connected by ferry lines. The country surrounding the city produces immense quantities of lumber, live-stock, coffee, and tobacco. Population, 800,500.

RIO GRANDE (rē'ō grän'dā), a river of North America, which has its source in the San Juan Mountains of Colorado, and after a general course of 1,800 miles toward the southeast enters the Gulf of Mexico a short distance below Brownsville, Texas. It is shallow in most of its course, and is navigable only about 500 miles from its mouth. The channel is almost due north and south in New Mexico, where it receives the Puerco River, and thence forms the boundary between Texas and Mexico. The most important tributary is the Rio Pecos, in Texas. In Mexico it receives the Rio Conchos, Rio Sabinas, and Rio San Juan. Brownsville, Texas, and Matamoros, Mexico, are the chief towns on its banks.

RIO NEGRO (nā'grō), an important river of South America, one of the chief tributaries of the Amazon. Its source is in the plains of southeastern Colombia, thence it flows east into Venezuela, makes a curve toward the south, and after receiving the Ucayari River, flows southeast and joins the Amazon at Manaos, Brazil. Its entire course is 1,250 miles, much of which is navigable. Large forests are contiguous to the Rio Negro, and there is direct communication for steamships between it and the Orinoco by the Cassiquiari, thus joining the Orinoco and Amazon river systems into a great commercial route. Rio Negro is also the name of an important river of Argentina, south of which is the region known as Patagonia. Its source is in the Andes Mountains of Chile. In its course, which is 700 miles, are many rapids and waterfalls. It flows into the Atlantic Ocean at about 41° south latitude.

RIPLEY, George, author and journalist, born in Greenfield, Mass., Oct. 3, 1802; died in New York City, July 4, 1880. He first attended public schools, and graduated from Harvard University in 1823. After studying theology in the Cambridge Divinity School, he became pastor of a Unitarian Church in Boston in 1826. In 1840 he resigned his charge, lived for some years in Europe, and founded the "Transcendental Magazine." Subsequently he originated the Brook Communistic Farm, which he abandoned in 1847 and removed to New York as a staff editor of the "Tribune." He contributed to a number of magazines, and published the "American Cyclopædia."

RIP VAN WINKLE, the name applied by Washington Irving to the hero of a legend published in 1820, which has taken a place among the classics of America. Almost all nations have a tradition about some sleeper who falls into the embrace of Morpheus, and after a long period of dormancy awakens to marvel at the changes written in the sands of time. Among the noteworthy incidents of this kind handed down by tradition are the seven sleepers of Mt. Celion, who slept 250 years. Nourjahad, wife of the Mogul emperor Geangir, who discovered the otto of roses, slept seven years; while Epimenides, the Gnostic, slept fifty-seven years.

Rip Van Winkle, according to the account given by Washington Irving of the legend, was a Dutch colonist of New York, who was noted at home as a good natured, but idle and henpecked husband. It was his custom to spend much of his time in the quiet inn kept by old Nicholas Vedder instead of attending his patch of maize and potatoes, just at the outskirts of the little village on the Hudson River. Sorely tried by his scolding wife, he set out with his gun and dog for a hunt in the forests of the Catskill Mountains. In a wild glen among the rocks he met Hendrick Hudson and his strange crew of the Half Moon, whom he aided in carrying a keg of liquor. The strange company played ninepins in mysterious silence, and as the balls rolled together they caused sounds nearly resembling peals of thunder, which lost none of their mystery as they bounded and reëchoed among the mountains. Rip became the waiter of this strange company, and as he drank of the sparkling liquid a deep stupor came over him until at length he fell into a sleep, from which he awoke only after a lapse of twenty years. On awakening one pleasant summer morning, he found his dog gone and the firelock by his side almost destroyed by rust; his beard had grown to an unusual length. On returning to his native village, he found strange faces on the streets and new names over the doors. His wife was dead, his own house was in decay, and the people who surrounded him looked upon him with distrust. At length he was recognized as Old Rip, who had disappeared mysteriously some twenty years before. Strangest of all is the realization that the quiet Dutch inn of Nicholas Vedder had been changed into the Union Hotel, and that before it was a painting of George Washington, instead of George III., due to the fact that the American Revolution had made him a citizen of an independent country. The story has been dramatized by a number of Americans, the most popular being the one of 1865, with

which the name of Joseph Jefferson is associated.

RISTORI (rĕs-to'ree), **Adelaide, or Marquise del Grillo**, eminent tragic actress, born in Cividale, Italy, Jan. 26, 1821. She was the daughter of strolling players, and thus became connected with the stage from infancy. In 1835 she appeared in the play entitled "Francesca da Rimini," and won great admiration and popularity. She played in Rome in 1849, but an attack by the French army caused her to enter a hospital as army nurse. Soon after the war she appeared in a number of leading Italian cities, and in 1855 played in Paris. Subsequently she made a tour of the United States, Mexico, and South America. Her roles meeting with greatest favor include Lady Macbeth, Mary Stuart, and Marie Antoinette.

RITTER (rĭt'ẹr), **Carl**, eminent geographer, born in Quedlinburg, Germany, Aug. 7, 1779; died Sept. 28, 1859. After studying at Halle, he was made professor of geography at the University of Berlin in 1820, and subsequently became connected with the military school as director. The work of Ritter, both as a teacher and author, has had a marked influence upon the study of geographical science, since he originated methods that were not known before his time. He deserves particular mention because of systematically accounting for the formation of rivers, glaciers, mountains, and other natural phenomena, associating with each geographical phenomenon such historical, geological, and physiological facts as render the whole interesting and more or less concrete. His principal writings include "Geography in its Relation to Nature and the History of Man;" "History of Geography;" "General Geography;" "Geographical and Historical Comparison of Europe," and "Architectural Monuments."

RITUAL (rĭt'ū-al), a book in which rites and ceremonies of any kind are set down, such as are used in churches, civic societies, or similar formal organizations. Ritualism is a term that sprang from a strict adherence to rites and ceremonies in public worship, and is quite largely applied to the practices of a section of English High Churchmen, who sought to make various changes in the forms of worship. It may be said to embrace a system of conducting public worship according to prescribed forms, as distinguished from a system in which the form of worship is left chiefly to the discretion of the person in charge. Rituals are used largely in the Anglican, Roman, Greek, and several other churches.

RIVER, a stream of considerable size, usually formed of several brooks or creeks. It may flow into another river, a marsh, or some large body of water, as a lake, gulf, or ocean. The land bordering on the sides of a river is its banks; the right bank is on the right hand when descending the stream, and the left bank is on the opposite side. The depression in which it flows is called its bed or channel. Other streams uniting with it are called its affluents or tributaries. The place where it begins is its source; and where it ends, its mouth. A region or district drained by a system of streams is termed a river basin, and the division between two or more river systems is called a divide. Rivers are of vast importance in the history of mankind, since they supply means for transportation and drainage, thus causing the rise of important cities and the growth of nations. They were even more important in the economic and political conditions of nations formerly than at present, since the building of railroads has made it possible for many manufacturing and commercial cities to develop importance even at considerable distances from the ocean or rivers, though it must be admitted that nearly all the great cities of the world are supplied with water navigation facilities.

Below is a table showing the length and area of some of the principal rivers:

NAME.	MILES IN LENGTH.	AREA OF BASIN, SQUARE MILES.
Mississippi-Missouri, N. A.	5,545	1,600,000
Nile, Africa	4,100	1,425,000
Amazon, S. A.	3,500	2,500,000
Yang-tse-kiang, Asia	3,200	950,000
Yenisei, Asia	3,000	1,100,000
Lena, Asia	2,775	950,000
Congo, Africa	3,000	1,300,000
Mississippi, N. A.	2,625	1,600,000
Cambodia, Asia	2,800	955,500
Amur, Asia	2,739	200,000
Hoangho, Asia	2,700	750,000
Niger, Africa	2,000	800,000
Volga, Europe	2,400	550,000
Obi, Asia	3,000	1,200,000
Colorado, N. A.	1,200	230,000
Mackenzie, N. A.	1,900	575,000
Yukon, N. A.	2,000	200,000
Rio Grande, N. A.	1,800	245,000
Brahmaputra, Asia	1,800	575,000
Indus, Asia	1,800	375,000
Danube, Europe	1,750	315,000
Tocontins, S. A.	1,700	350,000
Irtish, Asia	1,625	412,000
Murray, Australia	1,125	270,000

RIVIERA (rē-vē-ār'ạ), meaning seashore, the name applied in Italy to a region bordering on the Gulf of Genoa. It is properly separated into two divisions, the western coast, or Riviera di Pomente; and the eastern coast, or Riviera di Levante. The scenery of this region is very beautiful, and the whole may be reached by a railroad traversing the coast.

ROACH, **John**, shipbuilder, born in Mitchellstown, Ireland, in 1815; died in New York City, Jan. 10, 1887. In 1829 he emigrated to America. He first worked as a machinist, and later became the founder of important iron works. At the time of the Civil War he constructed six monitors and a number of large engines for the government. In 1871 he established the works of the Del-

aware River Iron Shipbuilding and Engine Company at Chester, Penn., an institution covering about 125 acres. It is one of the most noted of America, and many large vessels, engines, and boilers have been constructed there.

ROAD, an open passage appropriated to public traffic, and forming a line of communication for public use. The construction of highways is a matter of public concern, and varies according to the state of civilization and the resources of the country through which they pass. Highways of an excellent quality were built by the Romans, which were in fact pavements resting on a foundation of rough stones consolidated into one mass by mortar or grout. However, they designed them on systems so that they centered into particular cities, instead of making them general, thus contributing largely to build up particular towns as trade emporiums. The roads as a whole were in a poor condition in Europe until the rise of western powers, France and Germany taking an advanced rank in road-making. It may be said that a marked change in road-building has taken place since railroad construction began. Nations do not now expend as much time and money in highway building, but instead vest their construction and maintenance largely in local authorities.

Roadways are in a very backward condition in all Spanish-American countries. In the United States road-building is a local matter. The work is done partly under county supervision in some states, but generally under town or township superintendence. Congress authorized the construction of a national road westward from Boston in 1796, which passed through Pennsylvania, Ohio, and Indiana, but the construction of railroads caused it to fall into a state of neglect, though this particular road is still well-graded. In hilly regions and many of the eastern states roads do not conform to the direction of the compass, but in most of the states roads are located a distance of one mile from each other, thus dividing the land by straight lines into squares. In road-building it is necessary to take into account such natural obstructions as streams, swamps, and hills, these requiring either bridges, embankments, grades, or tunnels. The breadth of the right-of-way is usually sixty-six feet, and the width of the grade depends upon locality and traffic, though as a rule it is sufficiently wide for the passage of teams in all places. The advent of the bicycle and automobile has made the necessity of good roads even more apparent than formerly. In the United States it is customary for the driver to keep to the right when meeting vehicles, and in driving on roads that cross each other the right of way belongs to the driver who first reaches the intersection. It is obligatory on all persons driving upon the highway to exercise reasonable care in the safety of foot passengers and bicyclers. The latter are considered to be in possession of a vehicle within the meaning of the law, and are entitled to one-half the improved road on an equal footing with drivers of other vehicles.

ROANOKE (rō-ą-nōk'), a city of Virginia, in Roanoke county, 250 miles west of Norfolk. It is pleasantly situated on the Staunton River, which joins the Dan River at Clarksville to form the Roanoke River. It has excellent railroad facilities, and is surrounded by a mining and agricultural country. Among the manufactures are tobacco products, machinery, ironware, locomotives, cars, and hardware. In its vicinity are a number of mineral springs possessing medical value. The city has excellent school and church buildings. It is improved by electric lights, pavements, a public library, rapid transit, and other municipal facilities. Population, 1900, 21,495.

ROANOKE, a river of the United States, formed in southern Virginia by the confluence of the Staunton and Dan rivers, and after a course of 255 miles toward the southeast flows into Albemarle Sound. It is navigable to Weldon, North Carolina, a distance of 150 miles.

ROBERT I., king of Scotland. See Bruce.

ROBERT II., king of Scotland, born March 2, 1316; died April 19, 1390. He was the son of Marjory, daughter of Robert Bruce, and Walter, steward of Scotland, and thus the first of the Stuart kings. Both his parents died while he was yet an infant, but he was recognized as heir to the crown by parliament in 1318, and after the death of David II., in 1371, was formally crowned at Scone. In 1384 Scotland was invaded by the duke of Lancaster, and the English made a second invasion under Richard II. in 1385. Robert made a retaliatory expedition into England in 1388, which culminated in the battle of Otterburn on July 21, 1388.

ROBERT III., king of Scotland, eldest son of Robert II., born in 1340; died April 4, 1406. He was crowned king in 1390, and the government rested largely in the hands of his brother, earl of Menteith. Scotland was invaded by Henry IV. of England in 1400, but he soon withdrew his forces. The following year a Scotch army under Archibald Douglas made an expedition into England, which resulted in the defeat of the Scots at the battle of Homildon Hill in 1402. James, second son of Robert, was sent to France in 1406, but was captured by the English and retained for some time as a prisoner by Henry IV. This so grieved the king that he died at Rothesay soon after.

ROBERTS, Brigham Henry, author and statesman, born in Warrington, England, March 13, 1857. He came to the United States in 1866 and settled in Utah, where he graduated from the normal department of the Utah University in 1878. Being a member of the Mormon Church, he mar-

ried three times before polygamy was abolished in 1890. He served as a member of the Utah constitutional convention in 1895, and in 1898 was elected to congress, but opposition to his admission as a member on account of his polygamous relations soon arose. This opposition took form in a petition signed by 7,000,000 persons, asking that he be denied a seat in congress. Roberts defended his claim for admission with marked ability, but when it came to a vote in 1900, he was excluded on roll call, the vote being 268 in favor of exclusion out of a total of 318. Roberts contributed to many periodicals and magazines, and traveled extensively. Among his published works are "Life of John Taylor, Third President of the Mormon Church;" "New Witness of God;" "Outlines of Ecclesiastical History," and "The Gospel."

ROBERTS, Sir Frederick Sleigh, British military leader, born in Cawnpore, India, Sept. 30, 1832. He was educated in England, studying at Eton and Addiscombe, and in 1851 entered the army as second lieutenant. His first actual experience in war was in the siege and capture of Delhi in 1857, where he was wounded, but later he took part in the engagements of Lucknow, Cawnpore, and Malka. In 1867 he joined the Abyssinian expedition, accompanied the Lushai expedition of 1871-72, and in 1878 was made commander of the Kuram division of the army. He commanded an expedition for the relief of Kandahar, for which purpose he traversed a hostile mountainous region for 300 miles, from Kabul, Afghanistan, in a period of twenty days and succeeded in crushing Ayub Khan at the end of the march. He commanded the army of Madras in 1881-85, becoming commander-in-chief for India in the latter year. He was raised to the peerage in 1892, and in 1895 was appointed to command the forces in Ireland. In 1899 he surperseded Sir Redvers Henry Buller (born in 1839) as commander of the British forces in South Africa, and in 1900 became commander-in-chief of the army, succeeding Field-Marshal Wolseley, thus attaining the highest position in the British army. He received many distinguished honors and titles, among them an earldom from Queen Victoria in 1901. His writings include "Rise of Wellington" and "Forty-one Years in India."

ROBERTSON, Frederick William, eminent clergyman, born in London, England, Feb. 3, 1816; died Aug. 15, 1853. He descended from Scotch parents, attended the grammar school of Beverley, and in 1832 entered the Edinburgh Academy. In 1837 he graduated from Oxford University, and the following year became curate of St. Maurice, but resigned on account of ill health and traveled in various countries of Europe. After returning to England, he became curate at Cheltenham, in 1842, and five years later was made incumbent of Trinity Chapel, Brighton, a charge he filled successfully until his death. Robertson attained eminence by his originality, human sympathy, and industrious habits, always presenting his themes with marked interest. He was accused of being unorthodox because of his views on baptism, inspiration, and the atonement, and his friendship for the working classes led the more aristocratic to assail his preaching as being socialistic and democratic. He is the author of a number of works on religion, and founded the Workingmen's Institute in Brighton. "Lectures on the Influence of Poetry on the Working Classes" is one of his best known works.

ROBESPIERRE (rō'bes-peer), **Maximilien Marie Isidore**, eminent statesman, born in Arras, France, May 6, 1758; guillotined July 28, 1794. After studying in the schools of his native town, he entered the College of Louis-le-Grand in Paris, where he graduated. Later he studied law and established himself as an advocate in Arras. In 1783 he became a member of the Academy of Arras, and in 1789 was elected a deputy to the assembly of France, where he became distinguished as an advocate of democracy. Though a man of under stature and a shrill voice, he was a powerful influence, and exerted himself as a leader of revolutionary clubs, particularly of the Jacobins. It may be said that he represented the spirit and history of the Revolution after the death of Mirabeau, since his power was almost unlimited. In 1791 he became public accuser of the new courts of judicature, and after the dissolution of the assembly visited Arras, but returned soon after to plan the massacres of 1792, though remaining in the background, while Marat and Danton carried out his designs. He was elected first deputy of Paris in the same year, and shortly became a member of the convention that was to determine the fate of Louis XVI.

As a member of that body the efforts of Robespierre were tireless in favor of executing the king, which took place in December, 1792. Soon after followed his memorable contest with the Girondists, by whom he was made an object of attack. In this struggle he was supported by many leaders who wanted to give France preponderance in its contest with Europe and cared little for personal questions. The excitable events of that unfortunate period caused him to part friendship with Hebert and his associates, who were guillotined by a vote of the convention on March 19, 1794. He also differed from Danton and Camille Desmoulins, who were brought to the guillotine on April 5 of the same year. Robespierre was now completely in control and the "Reign of Terror" reigned, but a party soon formed in the convention in opposition to him, and he was publicly accused of despotism on July 27, 1794. Soon after he was thrown into Luxemburg prison, but the keeper released him the same night, and his supporters col-

lected for his defense in the Hall of Commune. A force of arms under Barras was sent for his arrest the following day. At the sight of bayonets he was deserted by his followers and taken before the tribunal, where he was speedily convicted as an outlaw, and the next day guillotined along with twenty-three of his supporters, among them Saint-Just and Couthon.

ROBIN, or Robin Redbreast, the name applied to several species of birds of the warbler family, which are native to Europe. They are so named from the red breast of

ROBIN REDBREAST.

the male, the female having a breast of a yellowish-brown color. The robin in America is a species of thrush, and is much larger than the redbreast. Its color is largely olive-gray and black. It is migratory, reaching the northern states and Canada in the spring. Two broods of young are reared each year, and they return to the same locality the following season. Robins are familiar birds, and have a pleasantly modulated song.

ROBINSON CRUSOE. See **Juan Fernandez.**

ROB ROY, meaning Robert the Red, celebrated Scottish outlaw, born in 1660; died Dec. 28, 1738. His true name was Robert McGregor, but he assumed the name of his mother's family, that of Campbell, because the Scotch parliament, in 1662, had outlawed the McGregor clan. His estate was on the east side of Loch Lomond, where he engaged extensively in rearing and training cattle, but in the rebellion of 1715 supported the cause of the pretender. Previous to this he had borrowed money of the duke of Montrose, but his financial losses made him unable to repay it, and the duke took advantage of the opportunity by depriving him of his estate. He became desperate on account of his misfortune and gathered a band of followers to make reprisals upon the property of the duke, driving away his cattle and consuming the grain harvested by his tenants. The English stationed a garrison at Inversnaid to apprehend the intruder, but they were unable to capture him or prevent his marauding raids. A reward of $5,000 was offered for his head, when he found shelter in a cave of Ben Lomond. Later he became reconciled with the duke and lived peaceably at Balquhidder, where his death occurred. In 1817 Sir Walter Scott published his celebrated novel, "Rob Roy," in which the daring exploits of this famous character are recounted.

ROC, or Rukh, in Arabian and Persian mythology, a huge bird, capable of carrying off an elephant and devouring it. It is mentioned in the "Arabian Nights' Entertainments," and according to Adolf Erman was suggested by the fossil tusks of a giant bird. In the Middle Ages a general belief prevailed in the existence of such a bird, a fact borne out by a number of writings coming down to us from that period. The first knowledge of this myth spread in Europe soon after the first Crusade.

ROCHAMBEAU (ro-shŏn-bō'), **Jean Baptiste Donatien de Vimeur, Count of**, eminent soldier, born in Vendome, France, July 1, 1725; died May 10, 1807. He secured a liberal education for the priesthood, but entered the army in 1742, and in 1749 became governor of Vendome. In 1780 he came to America as the head of a body of French troops to aid the colonists in the Revolution against England. He established his headquarters at Newport, Rhode Island, thence marched in 1781 against a detachment of Clinton's army, which he defeated on Manhattan Island, and later joined Washington's army in the siege of Yorktown, aiding efficiently until the war ended by the surrender of Cornwallis. Soon after he returned to France, where he became a deputy to the assembly in 1788, and in 1791 was created field-marshal. During the French Revolution he was imprisoned as an opponent of Robespierre, and the death of the latter saved him from the guillotine. Napoleon created him grand officer of the Legion of Honor in 1804.

ROCHDALE (rŏch'dal), a city of England, in Lancashire, ten miles northeast of Lancaster. It is situated on both sides of the Roch River, has excellent railroad connections, and the surrounding country is rich in deposits of coal and building stone. Among the manufactures are cotton and woolen goods, machinery, hats, hardware, and pottery. A cathedral dating from the 12th century is the most conspicuous building, but there are a number of hospitals, schools, and churches. Its trade is enhanced by canal and railroad connections with many trade centers of northern England. It has electric lights, telephones, and other facilities. Population, 71,500.

ROCHEFORT (rōsh-fôr'), **Victor Henri**, journalist and statesman, born in Paris, France, Jan. 30, 1830. After attaining a liberal education, he engaged with the Paris "Figaro" as a writer of dramatic and art criticism, and later became a member of the editorial staff. In 1868 he founded "La Lanterne," a periodical opposed to the empire,

which was soon suppressed by the government and Rochefort fled to Belgium, where he continued the publication of his paper.

VICTOR HENRI ROCHEFORT.

He was elected to the legislative assembly from Paris in 1869, when he immediately returned to France, and soon after founded "La Marseillaise." His course was favorable to a republic, and he was again sentenced to imprisonment in 1870, remaining in confinement until the fall of the empire, as a result of the battle of Sedan. After being liberated, he immediately became prominent in the government, and in 1871 was elected deputy. He was charged with instigating excesses of the Communists, and was sentenced for life to New Caledonia, a French penal station in the Pacific Ocean, from which he escaped in 1873 and came to San Francisco, California. By the amnesty of 1880 he was permitted to return to France, where he was elected to the chamber in 1885, but resigned his seat the following spring. He is author of "Adventures of My Life," an autobiography.

ROCHELLE (ro-shĕl'), **La**, a seaport of France, on the Atlantic, capital of the department of Charente-Inferieure, ninety-five miles northwest of Bordeaux. It is strongly fortified, has excellent railroad facilities, and a commodious harbor. The streets are well planned and beautifully improved, many of them having fountains and monuments. Among the manufactures are sugar, glass, cotton goods, spirituous liquors, and machinery. The trade consists principally in wines, merchandise, and supplies intended for the colonies. Its ancient name was Rupella, meaning little rock, and it has been the seat of a number of important battles. Population, 29,440.

ROCHESTER, a city in Minnesota, county seat of Olmsted county, thirty-five miles south of Red Wing. It is surrounded by a fertile farming and dairying country, which produces cereals and grasses. Rochester has ample railroad facilities, and contains important flouring mills, elevators, and machine shops. It is the seat of a state hospital for the insane and a Catholic convent, and has a fine system of public schools. Electric lights, telephones, waterworks, and a fine courthouse are among the improvements. Population, 1900, 6,843.

ROCHESTER, a city of New Hampshire, in Strafford county, seventy-six miles north of Boston. It has excellent railroad facilities, and a considerable trade in merchandise. Among the manufactures are woolen goods, leather, boots and shoes, bicycles, machinery, and earthenware. The surrounding country is agricultural, and produces fruits and cereals. It has fine schools, excellent municipal improvements, and a public library. Population, 1900, 8,466.

ROCHESTER, an important city of New York, in Monroe county, seventy miles northeast of Buffalo. It is situated near the mouth of the Genesee River, has excellent steamboat and railroad connections with other trade emporiums, and is noted for its extensive commerce and manufactures. The city has about 2,575 manufacturing establishments, which employ 45,000 people, and yield an annual output valued at $225,000,000. Among the principal products are cotton and woolen goods, farming implements, flour, machinery, tobacco products, engines, boilers, hardware, starch, soap, and utensils. It is supplied with all modern municipal facilities, including extensive systems of waterworks, sewerage, rapid transit, electric and gas lights, street pavements, and numerous libraries. Among its public institutions are the county courthouse, an academy, the state arsenal, an institution for deaf mutes, numerous asylums, several hospitals, public schools, and other educational institutions. It is the seat of the Warner Astronomical Observatory, and the Warner and Kimball factories of musical instruments. The city has a number of excellent public parks and well improved cemeteries, among them the picturesque Mount Hope Cemetery, with an area of 200 acres. Many scientific, religious, and educational associations are maintained, thus affording ample facilities for the artistic and cultured side of life. Rochester was incorporated as a city in 1834. It ranks twenty-fourth among the cities of the United States. Population, 1900, 162,608.

ROCKEFELLER, John Davidson, capitalist, born in Richford, New York, July 8, 1839. His parents removed to Cleveland, Ohio, in his infancy, where he attended the public schools, and in 1858 entered business on his own account. Well applied industry and aptitude for affairs made it possible for him to succeed, though his means were at first limited. In 1860 he entered the petroleum business on a small scale, but soon became proprietor of a refinery in Cleveland, and in 1870 was made president of the Standard Oil Company, a vast corporation of a monopolistic nature. Rockefeller is noted for his liberality in supporting educational and religious institutions, his gifts for that purpose amounting to millions of dollars. In 1889 he furnished the means to reconstruct the University of Chicago, and made endowments to it that aggregate about $5,500,000.

ROCKET. See **Fireworks.**

ROCKFORD, a city in Illinois, county seat of Winnebago county, on Rock River, ninety miles west of Chicago. It has excel-

lent railroad facilities, and enjoys a large manufacturing and commercial trade. The principal manufactures include cotton and woolen goods, sugar, flour, machinery, hardware, and dairy products. It has modern provisions for rapid transit, electric and gas lighting, sanitary regulations, and educational and religious advantages. Among the public buildings are many fine schools and churches, a seminary, and a modern courthouse. The surrounding country is noted for its fertility and the production of large quantities of dairy products. Population, 1900, 31,051.

ROCKING STONES, or **Logan Stones**, the large stones that are poised so as to rock when pressure is applied. It is thought that this phenomenon is due in

ROCKING STONE.

many cases to bowlders having been deposited by the action of glaciers, but some rocking stones have been formed by the action of wind, water, and other similar natural causes. The most remarkable example of this class is found in the rocking stone of Tandil in Argentina, about 200 miles south of Buenos Ayres. It weighs 700 tons and is so nicely poised as to rock in the wind. Rocking stones may be seen in some parks, but they have been formed artificially by cutting around the center points of their bases, in imitation of those originated naturally. Examples are found in Greece, where they are used as monuments for the dead.

ROCK ISLAND, a city of Illinois, county seat of Rock Island county, on the Mississippi River, opposite Davenport, Iowa. It has extensive railroad facilities, and is connected with Davenport by a fine government bridge costing about $1,200,000. It is supplied with electric lights and railways, street pavements, waterworks, and excellent school and church buildings. Among the chief manufactures are cotton goods, ironware, wagons, glass, flour, lumber products, machinery, and agricultural implements. An island in the river, called Rock Island, is the property of the United States, and is used as a park and an arsenal. The city is the seat of the Lutheran Augustana College, an institution founded in 1860. It has thirty instructors, 700 students, and a library of 20,000 volumes. Rock Island is surrounded by a rich farming country, which contains deposits of bituminous coal. It has a fine courthouse, several libraries, and a growing trade in merchandise. Population, 1900, 19,493.

ROCKLAND, a city of Maine, in Knox county, on Penobscot Bay, eighty-five miles northeast of Portland. It has an excellent harbor, convenient railroad connections, and is the county seat. The chief manufactures are boots and shoes, clothing, boilers, sailing vessels, lime, and machinery. The surrounding country is fertile, producing cereals and grasses, and contains mineral deposits, mostly granite and limestone. In 1630 the first settlement was made in its vicinity. It was known as East Thomastown, but the name was changed to Rockland in 1850. Population, 1900, 8,150.

ROCK RIVER, a stream that rises in Wisconsin, thence flows through Illinois and joins the Mississippi immediately south of Rock Island. It has a course of 375 miles, and flows through a rich farming country. Among the cities on its banks are Janesville, Beloit, Rockford, Sterling, and Rock Island.

ROCKS. See **Geology.**

ROCKVILLE, a city of Tolland county, Connecticut, twenty miles northeast of Hartford. It is provided with important railroad facilities, secures its supply of water from Snipsic Lake, and is improved with numerous municipal conveniences. It has manufactures of cotton, silk and woolen goods, paper, stationery, and machinery. The city has numerous churches and excellent public schools. Population, 1900, 7,287.

ROCKY MOUNTAIN GOAT, a ruminant quadruped native to the Rocky Mountains, ranging from Idaho to the Arctic

ROCKY MOUNTAIN BIGHORN.

Circle. It is a beautiful animal, covered with long white hair, and its skin is valued in the market. Its size is about that of the

domestic goat, but the limbs are stronger and the body is heavier. The mane is erect, horns slightly curved, and the beard on the throat is quite like that of a goat, but it is a much finer looking animal. The Rocky Mountain sheep, or bighorn, is an allied animal. It has shorter hair and immense horns.

ROCKY MOUNTAINS, an extensive mountain system, embracing the most elevated peaks of North America. The name is sometimes applied to the entire mountain region in the western part of the United States, but it belongs more particularly to the eastern system of the Cordilleras of North America, extending from the southern part of New Mexico to the Arctic Ocean, terminating near the northeastern corner of Alaska. Its extent from New Mexico in a northwesterly direction is more than 1,000 miles, and incloses elevated plateaus of very arid lands. This system is widest at about the latitude of 40°, and the trend is nearly parallel to the Pacific coast.

The principal ranges in New Mexico are the San Andres, Manzano, Gallinas, and Taos Mountains. Castilla Peak, in the last named range, is one of the highest elevations, being 12,615 feet above sea-level. In Colorado many complicated ranges extend nearly parallel to each other, the most elevated peaks being Pike's Peak, 14,150 feet; Gray's Peak, 14,345 feet; Long's Peak, 14,275 feet; and Mount of the Holy Cross, 14,176 feet. The Laramie, Big Horn, and Shoshone Mountains are among the ranges of Wyoming, and Fremont Peak, in the Wind River range, is one of the most elevated peaks, being 13,570 feet. The Wasatch Mountains trend in many parallel ranges through Utah, and in the northern region of that state is an extensive lake system, including Great Salt Lake. The principal ranges include Gilbert Peak, 13,690 feet; Mount Hilgard, 11,460 feet; Mount Terrill, 11,600 feet; and Wheeler Peak, 12,075 feet. The lofty ranges of the Bitter Root Mountains form a part of the boundary between Montana and Idaho, with connected ranges in each state and in Washington, whence the Rocky Mountain system passes into Canada.

In Canada it forms the boundary between Alberta and British Columbia, whence the principal ranges pass through the upper part of the latter and thence through the Northwest Territory, with ranges trending westward into Alaska. The most elevated peaks of Canada include Mount Brown, 16,000 feet; Mount Hooker, 15,700 feet; Mount Logan, 19,514 feet; and Mount St. Elias, 18,010 feet. The two last named are near the Alaska boundary, and some distance northwest in Alaska is Mount Wrangel, 19,400 feet high. In 1901 the United States geological survey reported that Mount McKinley, height 20,464 feet, is the highest peak in territory belonging to the United States. It is situated about 200 miles northwest of Mount Wrangel, which was formerly considered the highest peak in Alaska. Mineral wealth is abundant in the Rocky Mountains, including gold, silver, copper, iron, granite, coal, petroleum, and many others, and the region possesses some of the most extensive and productive mines in the world. The building of railroads in practically all parts of this mountain region has caused the rise of great cities, while settlers have been attracted there to establish productive vineyards, orchards, and farms. In many regions stock raising is a vast industry. Some portions are noted for their excellent scenery, particularly the Yellowstone National Park. The Missouri, Columbia, Colorado, Rio Grande, Arkansas, Mackenzie, Yukon, and other great rivers of North America have their source in the Rocky Mountains.

RODGERS, John, naval officer, born in Hartford county, Maryland, Aug. 8, 1812; died in Washington, D. C., May 12, 1882. He was a son of Capt. John Rodgers (1771-1838), who attained distinction by firing the first shot of the War of 1812. In 1828 he entered the navy, and in 1853 secured command of the steamer John Hancock; then sent on an exploring expedition to the North Pacific. He commanded the monitor Weehawken in 1863, when that vessal captured the Confederate ironclad Atlanta, and was made commodore for his services. In 1869 he was given command of the China fleet as rear-admiral, and two years later captured several forts in Corea, thus ending the outrages perpetrated on American commerce off the Corean shore. He served as commander of Mare Island navy yard at San Francisco in 1873-77, and in the latter year became superintendent of the United States Naval Observatory at Washington, a position he held until his death.

RODMAN, Thomas Jefferson, soldier and inventor, born in Salem, Indiana, July 30, 1815; died in Rock Island, Illinois, June 7, 1871. He graduated from the West Point Military Academy in 1841, and was immediately appointed lieutenant of ordnance. After experimenting with guns and gunpowder, he discovered a plan for casting large guns and cooling them from the inside. He is the inventor of several smooth-bore guns of large size, and introduced mammoth powder as an effective agent. Guns of his invention were used in the army and navy during the Civil War, and he had charge of the Watertown arsenal till 1865, when he was engaged to construct an arsenal on Rock Island, in the Mississippi, near Rock Island, Illinois. He wrote "Experiments on Metals for Cannon and on Cannon-Powder."

ROE, Edward Payson, novelist, born in New Windsor, New York, March 7, 1838; died in Cornwall, New York, July 19, 1888. He studied at Williams College, and later took a course at the Union Theological Seminary in New York City. After serving as

chaplain in the Union army from 1862 till 1865, he settled as pastor of a Presbyterian church in Highland Falls, New York, and in 1874 removed to Cornwall to devote himself to literature and the cultivation of small fruits. His novels are of considerable merit, and have been read extensively in America and Europe. The first work from his pen, "Barriers Burned Away," appeared in 1872, and is a story of the Chicago fire. Other works embrace "Opening of a Chestnut Burr;" "Nature's Serial Story;" "He Fell in Love With His Wife," and "Miss Lou." "Success with Small Fruits" is a work on gardening, for which he gathered material from his own experience.

ROEBUCK (rō'bŭk), or **Roe-Deer**, a species of deer native to the mountains of southern Europe. It is found only in the timbered highland regions. Its weight is sixty pounds, and it is about thirty inches high at the shoulders. The color is tawny-brown. Its tail is almost concealed in the hair, and is characterized by a large, white anal disk. The horns are seldom over nine inches long, and the flesh is valued as food; it is considered better than that of the stag.

ROENTGEN, William Conrad, German physicist, born in Holland, in 1845. He graduated from the University of Zurich in 1870, but when his favorite professor, Dr. Kundt, removed to Würzburg, he followed him to that city. In 1873 he removed to Strasburg, where he was made assistant professor. He became professor of mathematics and physics in the Agricultural Academy of Hohenheim in 1875, but returned to Strasburg University the following year. He was made professor and director of the University and Institute of Physics in Giessen in 1879, and in 1888 became professor of physics at Würzburg, Bavaria. Röentgen is the author of several works treating on the branches taught by him, and also the writer of numerous treatises for papers and magazines. In 1895 he attended the Würzburg Physico-Medical Society, and announced a new kind of ray, which he called the X-Ray. This discovery of seeing and photographing what is ordinarily unseen excited universal attention, and is one of the greatest achievements of the latter part of the last century, its application in many respects being of great value. He was soon after summoned before the emperor of Germany to exhibit his discovery, and was permitted to make a shadowgraph of the bones of the emperor's arm. The emperor soon after decorated Röentgen with the Order of the Royal Crown, and he was created a baron by Ludwig of Bavaria. Other discoveries made by him relate to the method of determining the intensity of sunlight, the transmission of electricity through gases, and to the theory of flame-sounds. See **X-Rays**.

W. C. ROENTGEN.

ROGATION DAYS (rō-gā'shŭn), the three days immediately preçeding Ascension Day; hence, they always occur on Monday, Tuesday, and Wednesday. They are observed with litanies, and in some places with processions, to obtain God's blessing on the crops and to invoke His assistance in times of public peril.

ROGERS, John, sculptor, born in Salem, Mass., Oct. 30, 1829. He was educated in his native city and at the Boston high school, after which he engaged as clerk in a mercantile house, but was compelled to change his occupation on account of weak eyesight. Soon after he was employed in a machine-shop at Manchester, New Hampshire, and in 1856 took charge of a railroad repair shop at Hannibal, Missouri, where he practiced modeling in clay. He went to Europe to study art in 1858, and the following year went to Chicago, where he modeled his celebrated "Checker Players." His largest work is the equestrian statue of Gen. J. F. Reynolds, now before the City Hall in Philadelphia. His productions embrace many statues incident to the Civil War and home life. They include "Slave Auction;" "One More Shot;" "Picket Guard;" "Going for the Cows;" "Coming to the Parson," and "Favorite Scholar." A bronze group illustrating Irving's "Legends of Sleepy Hollow" is his finest work. He died July 27, 1904.

ROGERS, Randolph, sculptor, born in Waterloo, New York, July 6, 1825; died in Rome, Italy, Jan. 15, 1892. After attending the public schools, he engaged in mercantile pursuits, but in 1848 went to Europe to study sculpture for two years in Rome. After returning to the United States in 1850, he conducted a studio in New York City till 1855, when he returned to Italy. His works are among the best known of those produced by American sculptors. Among them are "Genius of Connecticut," on the state capitol at Hartford; statue of John Adams, in Mount Auburn Cemetery; statue of William H. Seward, on Broadway, New York City; statue of Abraham Lincoln, in Philadelphia; and "Angel of Resurrection," on the monument to Col. Samuel Colt, in Hartford, Conn. The bas-reliefs representing scenes from the life of Columbus, now on the bronze doors of the capitol at Washington, are also by Rogers. Other productions include "Lost Pleiad;" "Group of Indians;" "Boys Skating;" "Ruth," and "Isaac." He executed portrait statues of Abraham Lincoln and William H. Seward.

ROGERS, Samuel, poet, born in London, England, July 30, 1763; died Sept. 18,

1855. He was the son of a London banker, and after receiving a careful education entered his father's establishment as a clerk. In 1793 he became head of the firm. His first poetic work, "An Ode to Superstition," was published in 1786, and his best work appeared in 1792, entitled "Pleasures of Memory." Soon after he retired from business, having accumulated considerable wealth, and devoted the remainder of his time to literary study and travel in Europe. His later productions include "Human Life;" "Epistles to a Friend;" "Voyage of Columbus," and "Table Talk." His writings possess considerable value, but they are not read extensively.

ROHLFS (rölfs), **Friedrich Gerhard**, German traveler, born in Vegesack, Germany, April 14, 1831; died June 3, 1896. After graduating from a medical institution of Berlin, he engaged with the French army in Algeria as surgeon, and in 1860 entered upon an expedition of discovery in Morocco. He made extensive tours through North Africa in 1863-65, and two years later joined the English expedition against Abyssinia. He traveled in Cyrenaica in 1868, and with the support of the khedive of Egypt made an expedition into the Libyan Desert in 1873. In 1875-76 he traveled in North America, visited the African Kufra Oasis in 1878, and Abyssinia in 1880. He was German consul-general at Zanzibar in 1885, but returned to Germany the following year and took up his residence in Weimar. His writings include "From Tripoli to Alexandria;" "Journey through Morocco;" "Diagonally Across Africa;" "My Mission to Abyssinia;" "Discoveries and Explorations in Africa," and "Land and People of Africa."

ROLAND (rō'land), or **Orlando**, the celebrated knight of the court of Charlemagne, who is famous as a hero of romance. Tradition places him in the relation of nephew to Charlemagne, and his character is portrayed as that of a loyal warrior, both skillful and brave. Little is known of him, and writers have gone so far as to assert that it is altogether uncertain whether Roland represents a real or an imaginary person. We learn both from German and Frankish literature that Charlemagne was at Paderborn in 778, where he was busied in establishing civil government among the Saxons and attending to their admission into the Christian Church. He was visited while there by a Saracen chief, who proposed to deliver a region south of the Pyrenees to the Franks, a proposition at once accepted by the great commander. Accordingly he marched at the head of a large army into Gascony, where he compelled Duke Loup to do him homage, and annexed Pampelona and Saragossa. After finding that the Saracen ally could render but little assistance, Charlemagne decided to return to France, and while slowly threading through the valley of Roncesvalles the rear-guard was attacked by a large body of Gascons. Roland immediately rushed to the defense, but in a most gallant fight was slain while leading his troops. This incident was the occasion of the celebrated "Song of Roland," which has remained an interesting piece of literature. It was sung at the head of the Frankish troops for centuries. A notable instance is the conquest of England by William of Normandy, when it was sung by the marching columns to keep them in good cheer. Visitors in the Pyrenees are still shown the place that was the scene of the exploits of Roland, and his story is one that still passes current among the hardy mountaineers.

ROLAND, Marie Jeanne, eminent lady of France, born in Paris, March 17, 1754; guillotined Nov. 9, 1793. She was the daughter of Pierre Gratien Philopon, an engraver, who lost his money by speculation, while her mother died at an early age. She was endowed by nature with great beauty and intellectual strength, and from childhood possessed a remarkable interest in study and reading. In 1780 she married Jean Marie Roland (1734-93), a French minister of the revolutionary period, who is celebrated as a leader of the Girondists. Her husband became minister of the interior in 1792, but was compelled to flee from the turbulent scenes occurring in Paris the following year, finding safety at Rouen. Madame Roland had been a conspicuous and influential figure among many of the leading statesmen, such as Buzot, Gironde, Brissot, and Petion. In the earlier period of the revolution she was on terms of friendship with Danton and Robespierre. It is not hard to understand how suspicion would attach to her as an influential factor in forming the policy of the Girondists, especially since her husband had fled from the scene of excitement, and she was accordingly placed under arrest on May 31, 1793. Though an avowed advocate of the establishment of a republic, she was releaesd in June, but shortly after was re-arrested and in November brought to the guillotine. Her last words were "O Liberty, what crimes are committed in thy name!" Her husband became entirely prostrate when hearing of the execution, and committed suicide on Nov. 15, 1793.

ROLFE, William James, editor and author, born in Newburyport, Mass., Dec. 10, 1827. He was educated at Amherst College, but left before graduating and engaged as school teacher in Cambridge, Mass. In 1869 he became editor of the "Popular Science News," but devoted much time to writing school text-books and editing poetical works. Harvard University granted him the degree of master of arts in 1859. The same degree was granted to him by Amherst in 1865, and the degree of doctor of literature in 1887. Rolfe traveled extensively in Europe. In 1892 he visited Tennyson at Aldworth, and in the same year published

an account of the visit in "The Critic." Among his writings is "Cambridge Course of Physics," in six volumes. He edited Craik's "English of Shakespeare;" Lamb's "Tales from Shakespeare," and Curry's "Tales from Scottish History."

ROLLING MILL, an establishment in which metal is made into desired forms by being worked between pairs of rollers. The crude iron ore taken from the mine by blasting is transferred to the rolling mill, where it is puddled and rolled. Puddling involves heating by means of a furnace, whereby such impurities as sulphur, carbon, silicon, and others are separated from the iron. The separation takes place while the ore is in a melted condition; the iron forms into granules as the mass is stirred by the puddlers with an iron rod or by machinery. When a bulk of molten iron has collected by the union of granules, it is taken to the hammer, where it is formed into balls. Thus heated and balled, it is made into bars or sheets by the rolling mill. This machine consists of one or more pairs of iron rollers, so adjusted that they may be set nearly in contact by means of set-screws. The rollers are supplied with grooves so made that the desired form is given to the heated iron as it passes between them. It is gradually decreased in size and increased in length in the process of passing through the rollers, by reason of each roller having a series of grooves gradually decreasing in size toward one end. The process differs somewhat according to the product desired. Generally the ore is passed through the mill two different times. The first time it is worked to remove the impurities remaining after puddling, after which the iron is reheated and passed through the mill a second time to form it into bars, sheets, rails, hoops, or any form desired.

ROMAN CATHOLIC CHURCH, the denomination of Christians that recognizes the pope or bishop of Rome as its visible head, and which assumes to be the only catholic and apostolic church. The word catholic, meaning universal, was used by early Christians and continued to be the common designation of the vast number of Christians throughout the Middle Ages. Protestants refused to admit that the church which they left is entitled to call itself Catholic. From the beginning of the Reformation they prefixed the adjective Roman, while the Catholics claim the designation Catholic without a qualifying adjective. Theoretically the Roman Catholic Church claims spiritual authority on earth. This claim is based on the belief that Christ conferred upon Peter a primacy of jurisdiction, that Peter fixed his see at Rome, and that the bishops of Rome have succeeded him in his prerogatives of supremacy. This view is strengthened by Catholic historians in that they refer to Rome as a center at which appeals from other churches on matters of doctrine and discipline were decided, bishops nominated, and heresies condemned. However, Protestant historians question whether Peter fixed his see at Rome, and regard the superiority of Rome as a center largely the result of its political and social power.

The teachings of the Roman Catholic Church are based on the Scriptures and tradition. They are set forth distinctly in the Apostles' creed, the Nicene creed, and the Athanasian creed. To these Pope Pius IV., in 1564, added the articles on the invocation of saints, on entire transubstantiation of the eucharistic elements in the body and blood of Christ, and others that distinguish it largely from the Protestant creeds and those of other Christian sects. Seven sacraments are recognized, those of baptism, confirmation, the eucharist, penance, holy orders, matrimony, and extreme unction. In 1854 the dogma of the immaculate conception of the Virgin Mary was added, and in 1870 that of papal infallibility. Catholics believe in the existence of a purgatory and the necessity of confession, and make a clear distinction between doctrine and discipline. Doctrine is held to be embodied in the teachings of Christ and his disciples. On the other hand, discipline includes the rules laid down for the government of the church by the councils, the religious observances and practices, the administrations of sacraments, and confessions and fasting. The membership of the church consists of all persons who, having been baptized, hold to its doctrines and recognized jurisdiction.

The pope is chosen for life by the College of Cardinals. He is the center of unity and the supreme head, and without his consent no bishop can be consecrated. Cardinals at the head of congregations direct the administration of the church, and these answer to ministers established in Rome by papal authority. In the Western churches the clergy are bound by a vow of celibacy, but in the Armenian and Greek branches orders are granted to persons married, but marriage after ordination is forbidden. A vast monastic system is maintained, which comprises orders known as seculars and religious. Each has its own superiors, and is responsible directly to the pope or to the bishops. The missionary work of the Catholic Church takes high rank in all countries of the world, through which means it has promoted a high standard of morality. Latin is used almost exclusively in all recognized rites in America, Europe, and missionary jurisdictions, but various other languages are employed in the East, as Coptic, Greek, Armenian, and Syro-Chaldæan. In the United States there are 12,075 churches, 11,600 priests, and 8,675,000 communicants. The Roman Catholics have sixty-five institutions of higher learning, with 625 professors, 5,500 students, and endowments aggregating $1,125,000. They support 3,920 parish schools, attended by 875,500 pupils. The total number of

Catholics in Canada is placed at 2,245,000, while the total membership of the world is 228,666,533.

ROME, a city in Georgia, county seat of Floyd county, on the Coosa River, sixty miles south of Chattanooga, Tenn. It has excellent railroad facilities, is surrounded by a fertile farming country, and enjoys a large trade in grain, cotton, and lumber. Among the manufactures are cotton goods, furniture, leather, farming implements, and machinery. The city is supplied with electric lighting and waterworks, and is the seat of an infirmary and two colleges. It has a modern courthouse, a library, and many fine school and church buildings. Population, 1900, 7,291.

ROME, a city of New York, in Oneida county, on the Mohawk River, fifteen miles northwest of Utica. It is an important railway center and is situated on the Erie Canal. Among the manufactures are engines, furniture, ironware, machinery, saddlery, glue, cigars, and wire. The city has excellent public schools, two libraries, numerous churches, and St. Peter's Academy, a Roman Catholic institution. Its streets are lighted by electricity, have pavements, and are well provided with a system of street railways. The surrounding country is agricultural and dairying, and produces large quantities of fruits. It is the county seat, and has excellent county buildings. Rome occupies the site of Fort Stanwick, and near it the battle of Oriskany was fought. Population, 1900, 15,343.

ROME, an important city of Europe, capital of Italy, and formerly capital of the Roman kingdom, republic, and empire. It is situated on the Tiber River, about fifteen miles from the sea. Its history contains much of interest, since it was not only one of the most important cities of the ancients, but has long been noted as a religious center of western Christendom. According to tradition, the city was founded by Romulus and Remus, two sons of Rhea Silvia, a priestess of the goddess Vesta, and of Mars, the god of war. These two children were ordered thrown into the Tiber by a usurper, but were cast ashore at the foot of Mount Palatine, where they were nursed by a wolf, but afterward taken and brought up as the children of one Faustulus. The city was named after Romulus, who became its first king. Its site is on the slopes of seven hills, in the center of which is Palatine Hill, rising 160 feet above sea-level.

The founding of ancient Rome is generally placed at 754 B. C., and the founders are regarded as Latins, who left Alba Longa in a colony to establish an outpost against the Etruscans. There is no reliable account of the early history of Rome, as the records were burned when the city was destroyed by the Gauls in 390 B. C. The early inhabitants were shepherds or farmers, who tilled the land upon the plain near by, but lived for protection within their fortification on Palatine Hill. At the time the Gauls destroyed the city, they left most of the buildings in ruin, and it was hastily rebuilt without planning for regularity in its streets. The streets remained narrow and crooked in many parts of Rome until Augustus Cæsar became emperor, in 31 B. C. He beautified the city by adorning it with monuments and works of art so that it was said of him, "He found the city of brick, and left it of marble." However, the groundwork for a great city was laid long before his time. The low places between the hills were improved by grading in the early history of the city, when also a huge system of drainage was constructed. The great aqueducts were begun by Appius Claudius Cæcus in 312 B. C., by which water was brought to the city from springs seven miles distant, and material additions were made until fourteen aqueducts were completed. These had a length of 300 miles. They still form a very interesting feature of modern Rome.

The Campus Martius was originally a marshy tract lying between Capitoline Hill and the Tiber. It was so named because of its use for military exercises. In this stood the theater of Pompey, an immense structure with a seating capacity for 40,000 persons. On Capitoline Hill was the splendid temple of Jupiter Capitolinus, called the Capitol. Near it was the theater of Marcellus, finished by Augustus in 11 B. C., and also the Colosseum, an immense oval building used for gladiatorial exhibitions, in which many Christian martyrs suffered death. It was about 600 feet long, 500 feet wide, and had a height of 160 feet. Its capacity was ample for 87,000 spectators. The largest structure was known as the Circus Maximus, situated between the Palatine Hill and the Aventine Hill, and had a seating capacity for 250,000 persons. The Circus Maximus has been long destroyed, but the ruins of the Colosseum are still to be seen. Rome had numerous public baths, the largest being the Thermæ of Titus, traces of which remain on Esquiline Hill. The famous Diocletian bath was the largest and most magnificent, and a portion of it is now used as a church. Its buildings included many excellent palaces, temples, and private residences. The most noted temples were the Temple of Venus, built by Cæsar; Temple of Peace, a magnificent structure built by Vespasian; and the Temple of the Sun, erected by Aurelian. Near the Forum are the triumphal arches of Severus, Titus, and Constantine, while that of Drusus is in the Appian Way. The beautiful Trajan pillar in the Forum is still standing, and there are remains of catacombs, subterranean galleries used as burial and meeting places, in many parts of the city. The Tiber was spanned by a dozen substantial bridges, eight or nine of which are intact. It is estimated that the population of Rome

in the time of Augustus was 1,300,000, while in the time of Trajan it reached about 2,000,000.

Modern Rome extends to both sides of the Tiber, as did the ancient city. It has substantial walls, those on the east bank of the Tiber dating from the time of Aurelian, in the 3d century. The city has been improved remarkably since it became the capital of United Italy, its streets having been not only extended and straightened, but material improvements having been added in the way of sewerage, paving, electric lighting, and rapid transit. Embankments have been constructed along the Tiber to prevent overflows, thus guarding against damages and disease common to the city in former times. Through the medium of vast excavations it has been possible to restore many historic structures and monuments, notably the Forum Romanus, the temple of Castor and Pollux, and the famous Sacred Way, which was the great central street of the ancient city. Many alterations and improvements have been made on the piazzas, parks, and boulevards, while monuments of modern structure have been dedicated to representative statesmen of modern Italy. The most notable building in Rome is the Cathedral of St. Peter, the most magnificent structure of the kind in the world. It is decorated by monuments and paintings by the great masters. Besides it, there are about 325 churches. Many of these are memorial churches, and are opened only on the day of the year assigned to the saint to whom they are dedicated. The Vatican adjoins St. Peter's, and is the palace of the popes. It contains the Vatican library, a picture gallery, and splendid museums. The palace on the Quirinal, formerly a summer residence of the popes, has been occupied by the king of Italy since 1870, but the Palazzo della Cancelleria is still occupied by those in connection with the church. Rome is noted for many great educational institutions, the most important being the university founded in 1303. It has departments of physics, zoölogy, mineralogy, botany, astronomy, anatomy, law, medicine, and theology. Among its equipments are excellent apparatus, botanic gardens, and an astronomical observatory. It is attended by 1,000 students. Rome has an excellent system of common schools, which is maintained by public grants and taxation. The city is the seat of numerous hospitals, charitable institutions, academies, and many excellent libraries.

ST. PETER'S AND THE COLONNADES.

Rome has been identified with the rule of the popes since the downfall of the Roman Empire in 476. An army under the constable of Bourbon captured and sacked the city in 1527, and Napoleon occupied it in 1798. He made Pope Pius VI. a prisoner and carried him to France, and soon after a Roman republic was established. A republican army under Garibaldi and Mazzini expelled Pope Pius IX. from Rome in 1848, but he was restored to power by a French army sent the following year for the overthrow of the new republic. With the fall of the French Empire, in 1871, new life was

enkindled for a united Italy, and in June of that year the present kingdom was established. The city has manufactures of silk and woolen goods, earthenware, musical instruments, toys, artificial flowers, jewelry, and machinery. It is a railroad center of some importance, though its ship trade is not material, since the Tiber is navigable only for small vessels. Most of the export trade is carried on by way of Fiumicino, its seaport on the Mediterranean, with which it is connected by railway. Rome is a gathering place for tourists and travelers, who go there to view its historical treasures. It is the Mecca that attracts students to study its paintings and sculptures. Population, 475,690.

ROME, an ancient nation of southern Europe, and one of the most powerful and historic of antiquity. Its history extends from the founding of the city of Rome in 754 B. C. to its downfall in 476 A. D., over twelve centuries. The history of Rome may be divided into three periods, according to the form of its government. They include the kingdom from 754 till 509 B. C.; the republic from 509 till 31 B. C.; and the empire from 31 B. C. till 476 A. D. It is thought that the Latins who founded Rome in 754 B. C. came as a colony from Alba Longa, and that the latter city was founded by Ascanius, a descendant from fugitive Trojans. Many different accounts have been published in regard to the founding of Rome, but the one most generally accepted is that the destruction of Troy by the Grecians led many fugitive Trojans to flee to Italy, where they were received kindly by King Latinus. Rhea Silvia, daughter of a deposed king of Italy, was the mother of Romulus and Remus, two children designed to be killed by the reigning king, but they were discovered and reared by a shepherd. Romulus became the founder of Rome and its first king. He encouraged settlements by constructing fortifications to protect the citizens against hostile tribes, building them in such a manner that the people could reside within the fortifications while they tilled the soil and reared their herds in the adjoining region. It is probably true that the early settlements were greatly enlarged by Aryans coming from Asia by way of Greece, and that the cities of Latinum formed a confederacy with Alba Longa at its head. The settlements made grew rapidly, expansion being due largely to fertility of the soil and natural advantages in the way of river and sea navigation.

The early government of Rome was aristocratic, being administered under a priest-king, who was assisted by a senate and an assembly. Later the city was attacked by the Sabines, a tribe occupying the upper valley of the Tiber, and afterward they captured Quirinal and Capitoline Hills. After many years of conflict the two tribes became united and formed the two parties known as Romans and Quirites, both having seats in the senate, while the king was taken alternately from each. Later the city was conquered by the Etruscans, who placed the Tarquins on the throne, and ornamented the city with elegant structures in the Etruscan style of architecture. They extended the city to include the seven hills, enclosing the whole with a wall that endured eight centuries. It was due to the Etruscans that Rome became the head of the thirty Latin cities within 150 years after it was founded. As the adjoining cities of Italy were conquered, the people moved into Rome and formed the plebeians, while the Latins, Sabines, and Etruscans constituted the patrician class, though the Tarquins were the friends of the plebeians. The nobles, becoming dissatisfied with the advance of the plebeian power and the corresponding restriction of the kings, joined other Latin cities to expel their Etruscan rulers, which they did in 509 B. C. The following is the chronology of the Roman kingdom, as generally given by historians: Romulus, 754-716; Numa Pompilius, 716-672; Tullus Hostilius, 672-640; Ancus Martius, 640-616; Tarquinius Priscus, 616-576; Servius Tullius, 578-534; and Tarquinius Supurbus, 534-509.

With the establishment of the republic, in 509 B. C., two chief magistrates were chosen. These were at first called prætors, but the name was later changed to consuls, and a constitution modeled by Servius was adopted. Conflicts continued between the Romans and the Etruscans till 295 B. C., when the latter were not only subdued, but Rome became the master of all Italy. However, contests of a political character were constant between the patricians and the plebeians. The former were descendants from the first settlers, and were rich, proud, and exclusive, making a demand of all the offices and emoluments of the government. On the other hand, the plebeians were the common people. They were denied the rights of citizens, and were not allowed to intermarry with the patricians. Besides, they were obliged to serve in the army without pay, and their want of means to carry on industrial enterprises at home rendered them creditors to the patricians, who reduced them to a form of slavery and sold them as slaves when unable to pay their debts. The plebeians urged their demand for equal privileges with the patricians for the first 200 years of the republic, and gradually their demands were complied with, a consummation hastened by the fact that they formed the principal part of the army. In 445 the law against intermarriages was abolished. Soon after the plebeians were granted three military tribunes with consular powers, and in 367 B. C. their victory was finally won, when they succeeded in rapid succession in securing the dictatorship, the censorship, the prætorship, and the right to be pontiff and augur.

The period of contest between the patricians and plebeians was disturbed more or less by foreign wars and internal strife among the different tribes. Rome was captured and nearly destroyed by the Gauls in 390 B. C., and the invaders agreed to recross the Apennines only on condition that they receive a heavy ransom. This invasion was in some respects beneficial to the Romans, since they were deeply impressed by the courage and strength of the Gauls, and at once began to rebuild their city. The next war took place in 280-276 B. C. against Pyrrhus, a Grecian colony in southern Italy, and resulted in the subjugation of the latter. Thus triumphant at home, Rome entered upon the First Punic War in 264, and continued the contest against Carthage until 241 B. C. The Second Punic War occurred in 218-201, and the Third in 149-146 B. C. These wars with the Carthaginians and their attendant contests covered a period of about one hundred years. Carthage, a city of Africa that had flourished over 700 years and numbered 700,000 inhabitants, was utterly destroyed, and the Carthaginian territory became the Roman province in Africa. While Hannibal was commanding the Carthaginians he made a treaty with Philip, king of Macedon, and out of this grew three wars against the Macedonians, which culminated in the battle of Pydna in 168 B. C. The results of these wars were reaped within a brief period, and included the downfall of Greece. In 146 B. C. Macedon became a Roman province; Corinth fell the same year that Carthage was captured, and all of Greece became the Roman province of Achæa. Thus victorious in Carthage and Greece, the Romans began to look toward the East for conquest. They had already defeated the Syrians at Thermopylæ in 190 B. C., and overthrown their power on the field of Magnesia, in Asia Minor.

The Roman nation extended its influence by the year 133 B. C. so as to include the vast region from the Atlantic to the Bosporus, besides a part of northern Africa and much of western Asia. Its soldiers had come in contact with both civilized and savage opponents, while many parts of Italy had been swept with fire and sword by Hannibal. Both of these circumstances had brought about material changes in economic conditions, since there was need for restoring rural prosperity, and the capital city needed a more rigid government. Conditions hastened on the civil wars, and Rome in rapid succession passed through conflicts that operated to destroy the republic. The first material internal disturbance arose over the measure introduced by Tiberius Gracchus in 123 B. C. This tribune sought to have the public land assigned in small farms to the natives with the view of giving every man a homestead, and proposed in addition that those receiving land should be allowed means from the public treasury to build houses and buy cattle. This measure was supported by all the friends of the common people, but it was opposed with great vigor by the nobles, and resulted in the assassination of Gracchus and his leading supporters by agents of the aristocracy. Soon after Jugurtha usurped the throne of Numidia, which occasioned the war against him in 118 B. C.

The invasion of Rome by the Teutons and Cimbri began in 113 B. C. These were followed by the social war on account of admitting Italians to citizenship, in 90 B. C.; the first Mithridatic War, in 88 B. C.; the Gladiatorial War, in 73 B. C.; and the great Mithridatic War, in 74 B. C. In the meantime occurred several wars resulting from disagreements among the generals and statesmen. The leading men of Rome at that period were Cæsar, Crassus, Cicero, Octavianus, Pompey, and Cato the Stoic. The first triumvirate was concluded by Pompey, Crassus, and Cæsar in 60 B. C., forming a compact so strong that they were able to manage the affairs of the republic at their pleasure, and it was cemented by Pompey marrying Julia, only daughter of Cæsar. Soon after followed the banishment of Cicero and the appointment of Cato to Cyprus, while Cæsar became consul and was afterward appointed as governor of Gaul. A civil war between Cæsar and Pompey began in 49 B. C., and, though Pompey had boasted that he could raise an army by stamping his foot upon the ground, he was obliged to flee from Rome without striking a blow. A battle between the two rivals occurred on the plain of Pharsalia, Greece, in 48 B. C., which resulted in the defeat of Pompey and he was obliged to flee to Egypt, where he was assassinated. Cleopatra was elevated to the throne of the Ptolemies by Cæsar, and the Syrians were so completely defeated that Cæsar sent his celebrated dispatch: "I came, I saw, I conquered." Victorious in the East, Cæsar hastened to celebrate a four-days' triumph in Rome, where he was created dictator for ten years and censor for three, and with remarkable success established peace in Spain.

The government of Cæsar was administered honestly. During his administration canals and highways were built, the poor were given employment, Rome was enlarged and beautified, and his vast dominion from the Euphrates to the Rhine was guarded with remarkable vigor. The senate created him dictator for life, but differences and jealousies arose that led to his assassination in 44 B. C. Cæsar's death was followed by the second triumvirate, which was concluded by Antony, Octavianus, and Lepidus. By its terms Brutus, Cicero, and Cassius were proscribed. Cicero was shortly after beheaded, and Brutus and Cassius met their opponents in the battle of Philippi in 42 B. C., but their complete defeat caused them to commit suicide in despair. Rome was divided

between Octavianus and Antony, the former receiving the West and the latter the East. A civil war between the two great leaders terminated in the naval battle of Actium, in which Antony and Cleopatra were defeated and fled to Egypt. With the battle of Actium ended the civil wars and the Roman republic. Octavianus, now master of the civilized world, became emperor of Rome in 31 B. C. and assumed the title of Augustus.

Though an empire had been established, Augustus made no radical changes, but kept all the forms of the republic. This course was necessary, since radical assumption of power would have resulted in his deposition. However, he really exercised absolute sway, and all the offices of trust were centered in him, including those of proconsul, consul, censor, tribune, and high priest. The empire at that time contained 120,000,000 inhabitants. It extended from the Euphrates on the east to the Atlantic on the west, and from the deserts of Africa on the south to the Danube and Rhine on the north. There were a hundred different nations in this vast dominion, each speaking its own language and worshiping its own gods.

The age of Augustus was one of general peace and prosperity, and it was not only the design of the emperor to maintain schools, extend literature, and effect internal improvements, but also to Romanize his subjects. This had already been accomplished in Gaul and was under way in Germany, but Arminius, a brave leader of the Germans, aroused his countrymen in opposition. In the year 9 A. D. Varus and his entire army in Germany met destruction, and Roman authority never was fully reëstablished in the country of the Teutons. The most important historical event of his reign was the crucifixion of Christ at Jerusalem, under Pilate, then Roman procurator of Judæa. On the death of Augustus, in 14 A. D. Tiberius, his stepson, became emperor by a decree of the senate. The emperors succeeding Tiberius were Caligula, in 37; Nero, in 54; Vespasian, in 69; and Domitian, in 81. Domitian was succeeded by the five good emperors, Nerva, Trajan, Hadrian, Antonius Pius, and Aurelius, who reigned from 96 until 180 and gave Rome both peace and prosperity. Aurelius is regarded one of the most virtuous and wisest of earthly rulers, but the later years of his reign were disturbed by invasions of the Germans and Slavs of Russia. He was succeeded by his son, Commodus, in 180, and from that time Rome began to decline.

The decline of Roman power is due to many causes. It may be said that the most prolific were the rise of factional militarism, the continuous invasions by the Goths, Germans, and Persians, the concentration of wealth into the hands of a few, and a low state of political and moral aptitude. During the 1st century Christianity spread rapidly over the Western Empire, and became a potent force in displacing the gods of the Romans. Though tolerant of all religious beliefs in every nation they conquered, the Romans persecuted the Christians. This was due to the fact that they alone refused to offer sacrifice to the gods of the empire. They absented themselves from the games and feasts, and were accustomed to hold their meetings at night. Soon they came to be regarded enemies of the state, and were persecuted by even the best rulers, as Trajan and Diocletian. Besides, a marked change came about in Roman citizenship, since the emperors were of provincial birth, and the army consisted chiefly of Germans and Gauls. Constantine was declared emperor by his troops in 306, and after overthrowing five rival contestants for the throne, he became sole ruler in 324. His reign marked an era in the history of the world, for the reason that he established Christianity as the state religion, and removed the capital from Rome to Byzantium, a Greek city on the Bosporus, which was renamed Constantinople in his honor. He made the government absolutely despotic by establishing a court of titled nobility, and weakened the power of the army. While Christianity made it possible for the empire to resist three centuries of barbaric invasions, it did not supply enduring strength. Julian the Apostate sought in vain to restore the old religion, and Valens taxed every energy of the empire to repel the invading Goths, who pressed forward to the very gates of Constantinople, but he was captured and burned.

Theodosius the Great for a few years stayed the division of the empire by enlisting 40,000 Goths under the eagles of Rome, but at his death, in 395, a division occurred between his two sons. The Eastern or Byzantine Empire passed to his son Arcadius, and the Western Empire to Honorius. There were continuous jealousies between the two empires, and to save his dominion from ruin Arcadius induced the invaders from the north to turn against Italy. The three great barbaric leaders were Alaric the Goth, Attila the Hun, and Genseric the Vandal. Alaric captured Rome in 410, while Attila swept like a scourge across Italy and only spared Rome from utter destruction, in 451, at the entreaties of Pope Leo. Genseric secured control of the Mediterranean and sailed up the Tiber in 455. Pope Leo met Genseric to entreat that the city might be spared, but he turned it over to the warriors to be sacked. He carried 30,000 slaves and vast treasures from Rome to Carthage, where he had founded an empire on the site of the city destroyed by the Romans six centuries before. Rome was now at the mercy of Odoacer, a German chief, who commanded that Romulus Augustulus, the last Roman monarch, lay down his useless scepter. The emperor yielded in 476, and

thus passed away the great Roman Empire. It is a curious incident in history that both the founder and the last sovereign of Rome bore the name of Romulus. Byzantine continued a recognized nation for a thousand years after the fall of Rome, ending with the capture of Constantinople by Mohammed II. in 1453. Rome was a province of the Byzantine Empire until 800, when Charlemagne received its crown, though its history had become merged into that of Italy some centuries before.

Politically there was a clear distinction between Rome and Latinum, but the language of the two sections was the same, and was called Latin. It belongs to the Aryan family of languages, and was perhaps spoken in several dialects as early as 1500 B. C. It is probable that the Latin and Greek came originally from the same source, since there is a manifest connection between the two languages. Classical Latin was formed in the period when Rome was a republic and an empire, though during the last two centuries of its history many foreign words were injected through contact with other languages, and by the 8th century it ceased to be spoken as a distinct tongue. The tongues developed from the Roman include the modern Romance languages, which are chiefly the Italian, Roumanian, Spanish, Portuguese, and French. The literature and language of the Latins were preserved in remnants of the great libraries, which were carried by the clergy to the convents in the Middle Ages, and were afterward brought to the great libraries of Europe, particularly those of Rome. Many of the leading writers of Europe, following the revival of learning, wrote largely in Latin, and both the language and its literature were subjects of profound interest in all the higher institutions of learning for many centuries. All the modern languages of European people contain a large proportion of Latin words, the Latin addition to English being made at the time of the Norman conquest. There is a peculiar accuracy of expression in the Latin, and this, in connection with its supplying the roots of many derivative words, causes it to still hold its place of prominence as a study in the secondary and higher institutions.

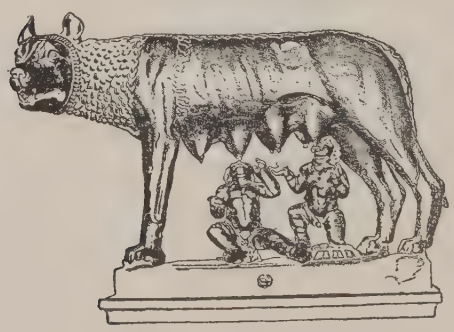
Roman literature was limited to a few writings for about five centuries after the founding of Rome. It may be said that the "Law of the Twelve Tables," prepared about 450 B. C. and hung up in the Forum, was the first prose composition of importance. The earliest writings were fashioned almost exclusively after Greek models, and their lyric, heroic, and dramatic meters came from the Greeks. Rome had elementary schools as early as 450 B. C., where reading, arithmetic, writing, and music were taught. Many of the teachers were Greeks, and the children of wealthy families were sent to Greece to complete their education, but excellent higher schools and colleges were later established in all the Roman cities. The first translation of Greek classics into Roman was made by a Grecian slave who came to Rome about 250 B. C. He also wrote and acted plays inspired by Greek writings. "The Origines" is a work written by Marcus Portius Cato in the 2d century, and in it is a history of the origin of Rome and several other cities of Italy. Ennius, a Roman of the same period, introduced a new style of literature, somewhat resembling the Grecian. His writings are largely poetical history, and his "Annals," a poetical history of Rome, was for two centuries the national poem. He was honored by having his bust placed in the tomb of Scipio. The writings of Plautus belong to the early part of the 2d century, and are noted for their vigorous and brilliant wit. Terence, a learned and graceful humorist who flourished about the middle of the 2d century, turned attention to greater refinement and more cultured forms of expression.

The Latin tragedies of the early Roman period were copied from the masterpieces of Sophocles and Euripides. Their comedies were translated from Aristophanes and other writers; their philosophy was borrowed from the Portico and the Academy, and their orators, even in the palmiest days, proposed to pattern after the speeches of Demosthenes and Lysias. To the 1st century B. C. belong the illustrious names of Varro, Cicero, Virgil, Horace, Livy, and Sallust. Varro founded large libraries and a museum of sculpture, cultivated the fine arts, and sought to awaken literary tastes among his countrymen. He wrote on history, theology, philosophy, and agriculture. Cicero is the most eloquent of all the Romans. He ranked high as an essayist, orator, and letter writer; his principal productions include his four orations on the "Conspiracy of Cataline." The Roman schools used his orations for lessons, and many of his essays are still familiar Latin text-books. Virgil and Horace are known as poets of the Augustan age. Virgil's "Æneid" is modeled after the Homeric poems, and has been used as a text-book up to the present time, holding its place in the schoolroom. Livy wrote forty-two volumes of Roman history, beginning with the fabulous landing of Æneas, and closing with the death of Drusus in the year 8 B. C. Sallust is another historian of eminence, his most noted writings embracing the "Conspiracy of Cataline" and the "Jugurthine War."

The noted writers of the 1st century A. D. include Seneca, Juvenal, Tacitus, and the two Plinys. Seneca was a brilliant orator, poet, and Stoic philosopher. His writings are remarkable for their moral purity. They include "Ethical Essays;" "Tragedies," and "Instructive Letters." Juvenal produced works remarkable for their satire and eloquence. Tacitus wrote in a grave

and stately, though sometimes sarcastic, style. His writings include "History of Rome;" "Life of Agricola," and a treatise on Germany. Pliny the Elder is the author of "Natural History," a work of thirty-seven volumes, covering the whole range of scientific knowledge of his time. Pliny the Younger was a charming letter writer; his writings extant include the "Epistles" and the "Eulogium upon Trajan." Quintilian was the most eminent rhetorician and literary critic of Rome. He lectured for twenty-five years and afterward published his discourses in a work entitled "Institutes." His writings belong to the early part of the 2d century. Other writers of Rome include Emperor Marcus Aurelius, St. Jerome, and Aurelius Augustine. Marcus Aurelius is remembered as a stoical writer, St. Jerome as the translator of the Bible into Latin, and Aurelius Augustine as the author of the prophetic book called "City of God" and of "Confessions."

ROMULUS (rŏm′ū-lŭs), brother of Remus, the traditional founder and first king of Rome. He was the son of Mars and Rhea



WOLF STATUE AT ROME.

Silvia, daughter of Numitor, the Latin king of Alba. When Amulius usurped the Alban throne, he commanded the babes to be thrown into the Tiber, but they were cast ashore at the foot of Mount Palatine and suckled by a she-wolf. A shepherd named Faustulus discovered them and with the assistance of his wife, Acca Laurentia, brought them up in his own home. After attaining manhood they discovered their true rank, and restored their grandfather, Numitor, to his throne. Afterward they resolved to found a city on the spot where their lives had been saved, but consulted the omens to see who should select the site. As the honor fell to Romulus, he was scorned by his brother Remus. Romulus then slew him and exclaimed, "So perish every one who may scorn the city." It was founded in 754 B. C. and called Rome after his own name, and he became its first king. He made his city the asylum of refugees. As there was a lack of women, young Romans seized maidens from the Sabines, which became known as the "Rape of the Sabines," and involved the new city in a war The contest soon after ended through the entreaties of the Sabine wives, and the two peoples became united. The death of Romulus, in 716 B. C., is accounted for in legends by the assertion that he disappeared in a thunderstorm.

ROOK, a species of crow. It differs from other birds of the crow family in having a naked spot at the base of the bill, and in

ROOK.

feeding on grain and insects instead of carrion. It is about twenty inches long, and the alar extent is forty inches. The color is black with a purple gloss. Rooks are sociable and gather in large flocks. They mostly inhabit cultivated and wooded districts, and prefer to nest near buildings. Rooks are native to Europe, and are common birds in western Eurasia. They are permanent in milder sections, but in the colder regions move southward on the approach of winter.

ROON (rōn), **Albrecht Theodor Emil von**, statesman and soldier, born at Pleushagen, Germany, April 30, 1803; died in Berlin, Feb. 23, 1879. He studied in the military academy at Berlin, and entered the army in 1821, but served as a teacher of cadets in 1824-27. His promotion to the different ranks was rapid, being made commander of a division in 1858, and the following year minister of war. He commanded in the Schleswig-Holstein campaign in 1864, and in the Austro-Prussian War of 1866, receiving for his services the Black Eagle from King William. Soon after the close of the war he was detailed to reorganize the army of northern Germany, in which he held a command during the war with France in 1870-71, receiving at its close the rank of count. He became field-marshal in 1873, and was made minister-president of Prussia, but retired from public life in 1874. He is the author of a number of books on military geography.

ROOSEVELT, Theodore (rō′ze-vĕlt), twenty-fifth president of the U. S., born in New York City, Oct. 27, 1858. He descended from a family of Hollanders that for generations has been noted for its philanthropy,

public spirit, and high intelligence. Klaas Martensen van Roosevelt, from whom he is seventh in descent, emigrated from Holland to New Amsterdam (now New York) in 1649, and became a prosperous burgher in the settlement. Several members of the family were prominent in state politics, and Robert B. Roosevelt, uncle of Theodore Roosevelt, served in congress a term of years and was United States minister to the Netherlands. The latter is the son of Theodore Roosevelt, Sr., and Martha Bullock Roosevelt. He graduated from Harvard University in 1880, and spent some time traveling in Europe. In 1881 he was elected to the New York legislature, serving in that body till 1885. Though a delegate to the republican convention in 1884, he joined the independents in supporting Grover Cleveland for president. He was appointed a member of the United States civil service commission in 1888, a position he filled with much ability until 1895, when he resigned to become president of the New York City board of police commissioners. This position he resigned in 1897 to become assistant secretary of the navy.

THEODORE ROOSEVELT.

At the outbreak of the Spanish-American War he entered the army as a volunteer and organized a regiment popularly known as the Rough Riders. It consisted of volunteers from all trades and walks of life, and rendered distinguished services in the Santiago campaign, particularly in the charge at San Juan Hill. In 1898 he was the republican nominee for governor of New York, and in the November election defeated his democratic opponent, Judge Van Wyck, with a majority of 18,079 votes. He was nominated for vice-president of the United States by the republican national convention at Philadelphia in 1900, and after an active canvass in many of the states the ticket received a large majority of the popular and electoral votes. At the death of President McKinley he succeeded to the presidency, taking the oath of office in Buffalo, New York, at 3:36 o'clock on Saturday afternoon, Sept. 14, 1901. On Dec. 3 of that year he issued his first message to congress, in which he outlined clearly his policy relative to the national government. In 1904 he was elected president with a plurality of 2,524,244 votes, the largest in the history of this country. Among the events of his administration are anti-trust legislation, the great anthracite coal strike, the treaty to complete the Panama Canal, and establishment of the Department of Commerce and Labor. He became president at a younger age than any of his predecessors. He is the author of a number of works, including "Hunting Trips of a Ranchman;" "Winning of the West;" "Life of Gouverneur Morris;" "History of New York City;" "Naval War of 1812;" "Essays on Practical Politics," and "The Rough Riders."

ROOT, George Frederick, musical composer, born in Sheffield, Mass., Aug. 30, 1820; died at Bailey's Island, Maine, Aug. 6, 1895. He studied music in Boston and New York, and taught in the latter city till 1850. In the same year he went to Paris, where he studied music a year, and after returning to America engaged in writing music. In 1859 he entered the firm of Root and Cody, in Chicago, which published his songs and pieces of music. Among his popular songs are "There's Music in the Air;" "Hazel Dell;" "Just Before the Battle, Mother;" "Tramp, Tramp, Tramp, the Boys Are Marching;" "Battle Cry of Freedom," and "Rosalie, the Prairie Flower." The Chicago University granted him a degree in 1872.

ROPE, the name of cordage formed of twisted fibers, such as fibers of flax, hemp, jute, cotton, or other vegetable species. The name is applied in an extended sense to cordage made of steel, iron, or other metallic wire. In the trade the distinction between a cord and a rope, other than of wire, is based on a collection of fibers one inch in circumference, though in popular usage smaller sizes are often termed ropes. Ropes made of vegetable fibers are composed of a number of rope yarns or rope threads. They are first twisted into strands, which in most cases are twisted together to form the finished product. The principal kinds are known as hawser-laid, cable-laid, and shroud-laid. In making a hawser-laid rope three strands are twisted left hand, the rope yarns being laid up right hand. A cable-laid rope is composed of three strands of hawser-laid rope twisted right hand. A shroud-laid rope is made of four strands, three strands being twisted round a central strand. In cases where great strength is needed a series of hawser-laid ropes is formed into a flat rope by being placed side by side and fastened together by sewing.

The vegetable fibers used in rope-making are derived largely from tropical countries. They include such fibers as the coir, secured from the husk of the cocoanut, the sisal hemp from South America, and the Manila or wild plantain produced largely in the Philippines. Formerly rope-making was carried on mainly by hand, but now machines are used for making all kinds of cordage. Ropes are made with great care, because uniformity of strength is necessary, for, as in a chain, the strength of a rope depends upon its weakest place. Among the improvements of recent times is the manufacture of wire ropes, which are made from a number of wires twisted together.

The strongest wire ropes are made of steel, but iron and other metals are used also, and to preserve them against rust a galvanic coating is applied. Ropes are used for various purposes in connection with mining, farming, manufacturing, and other productive enterprises. Metal ropes are used quite extensively in rigging ships and in elevators, and for various purposes in mining.

ROSARIO (rō-sä′rē-ō), a city of Argentina, on the Parana River, 170 miles northwest of Buenos Ayres. It is the capital of the Santa Fe province, and the second city of Argentina. The climate is temperate and healthful. It is finely located, has excellent railroad facilities, and a large interior and river trade. Among the manufactures are soap, flour, lumber products, furniture, utensils, leather, and machinery. The streets are regularly platted, intersecting each other at right angles. They are well paved and lighted with gas and electricity. The city has a fine cathedral, numerous other churches, and a number of schools, hospitals, academies, and institutions of higher learning. Population, 95,500.

ROSE, the common name of plants of the genus rosa. They have prickly stems and unequally pinnate leaves. About fifty

MOSS-ROSE.

species in a wild state have been described, most of which are confined to the north temperate zone, but by cultivation about one thousand varieties have been secured. These include both simple and double flowers, and a large variety of colors. Some of the varieties differ so materially from those in a native state that they are difficult to classify. The rose is easily cultivated, requiring sunshine, rich soil, and plenty of moisture. Among the common varieties are the damask, sweet brier, yellow, musk, Provence, moss, evergreen, and monthly. Poets have made the rose famous; oratory has been enriched with its virtues, and it has long been the emblem of reserve and faithfulness. It is the most beautiful and fragrant of flowers. Attar (q. v.), or otto of roses, is the most important product, but roses also possess medicinal properties. See Perfumes.

ROSEBERY (rōz′bẹr-ĭ), **Archibald Philip Primrose, Earl of**, statesman, born in London, England, May 7, 1847. He graduated from Oxford University, and in 1868 succeeded his grandfather as fifth earl. In 1872 he was made a commissioner to Scotland, became rector of the University of Edinburgh in 1880, and served as under-secretary of state in 1881-83. He was secretary of foreign affairs in the Gladstone administration in the beginning of 1886, but held the position only six months, until the fall of Gladstone's government. Rosebery took a position strictly in accord with the home rule policy, and effectually defended it in a number of able speeches. In 1889 he was elected for the city division of the London county council, and in 1892 succeeded Gladstone as premier, a position he held until the liberals went out of power in 1895.

ROSECRANS (rō′zẹ-krănss), **William Starke**, distinguished soldier, born in Kingston, Ohio, Sept. 6, 1819; died near Redondo, California, March 11, 1898. He graduated from the West Point Military Academy in 1842 as a classmate of John Pope and James Longstreet, and served as professor of engineering and natural philosophy at West Point in 1844-47. He resigned this position in the latter year, and retired to private life as an architect and civil engineer, but volunteered at the beginning of the Civil War, in 1861, and was commissioned brigadier-general in the regular army. In 1862 he became major-general of volunteers and commanded a division of the army of the Mississippi, taking part in the battles of Iuka and Corinth. Soon after he was made commander of the army of the Cumberland, taking part in the battle of Stone River, Tennessee, and at Chickamauga and Chattanooga, being defeated in the two last named engagements by General Bragg with a loss of 16,000 men. He was soon after succeeded by Gen. Thomas, pending the arrival of General Grant, and in 1864 became commander of the department of the Missouri, expelling General Price from that state. In 1867 he resigned his position in the army, and was mustered out with the rank of brevet major-general. President Johnson appointed him minister to Mexico in 1868, but the following year he engaged in railroad construction and settled in California. He served in congress as a democrat in 1881-85, and was register of the United States treasury the next eight years. Rosecrans was regarded a good strategist and military leader, his removal from command being due largely to unavoidable circumstances. Congress, in 1889, restored him to full rank and pay as brigadier-general, and placed him on the retired list.

ROSEMARY (rōz′mă-rў), an evergreen shrub of the mint family, which is native to southern Europe and western Asia. It is from three to eight feet high, has narrow, opposite leaves, and pale-blue flowers. All parts of the plant have an aromatic flavor.

The leaves have a pungent taste and yield an essential oil, called oil of rosemary, which is used as an aromatic perfume and in cookery. It possesses medicinal properties of use in headache and mental weariness, and is an essential ingredient in a perfume called Hungary-water.

ROSEMARY.

ROSES, Wars of the, the contest between the houses of Lancaster and York for supremacy in England. It constituted a disastrous warfare, with short intervals of peace, for thirty years, from 1455 to 1485. The former chose the red rose as an emblem, and the latter chose the white, hence the name. The house of Lancaster had been in possession of the throne for three generations, attaining to the crown in 1399, and being represented successively by Henry IV., Henry V., and Henry VI. The latter began to exhibit weakness of mind in 1454 and parliament accordingly appointed Richard, duke of York, protector of the realm during his illness. Richard had already advanced claims to the throne, and on the recovery of Henry he declined to give up his power and vigorously organized to maintain it by force of arms. In 1455 the battle of St. Albans was fought between the contending parties, in which the king's army was defeated and he became a prisoner. His queen, Margaret of Anjou, immediately organized a force in the north of England and won the battle of Wakefield, in which the duke of York was defeated and slain. Soon after Edward, son of the duke of York, raised an army and eventually defeated the forces of the queen, becoming Edward IV. in 1461. He was compelled to leave England shortly after by the army raised under the direction of Queen Margaret and the earl of Warwick, when Henry VI. was restored, but Edward returned in 1471 and defeated Warwick at Barnet and the queen at Tewkesbury, both being among the slain. Edward was succeeded by his son, Edward V., who, with his brother Arthur, was murdered in the Tower, and Richard III. became king. His reign ended with the battle of Bosworth in 1485, in which he was defeated and slain by the earl of Richmond, who succeeded him as Henry VII.

ROSETTA STONE (rō-zĕt'tȧ stōn), the name of a stone found near the city of Rosetta, Egypt; by a French engineer in 1798. It consists of black basalt, and bears an inscription of the year 196 B. C. in honor of Ptolemy Epiphanes. The inscription forms a key to the reading of the hieroglyphic characters. It is in the British Museum. The city of Rosetta is near the mouth of the Nile, thirty miles west of Alexandria. Population, 18,500.

ROSENKRANZ (rō'zẹn-krȧnts), **Johann Karl Friedrich,** educator and author, born in Magdeburg, Germany, April 23, 1805; died June 17, 1879. In 1828 he completed the course of study at the Halle University, and in 1833 succeeded Kant as professor of philosophy at Konigsberg. He belongs to the Hegel school of teachers, and is the author of many works extensively translated and read by school teachers and others as authoritative works on pedagogical and historical subjects. His writings include "History of Culture;" "History of German Poetry in the Middle Ages;" "Subjective Psychology;" "Hegel as the National Philosopher of Germany;" "History of Literature;" "Æsthetics of the Ugly," and "Goethe and His Works."

ROSEWOOD, the name given to various hard, close-grained woods derived from different species of trees, and so called from their rose-like scent when newly cut. Most wood of this class is dark-colored with various shades and stripes, and is used extensively in the manufacture of furniture and cabinet products. It is heavy and expensive, and is employed principally as veneers and for ornamental purposes. The finest quality is produced in Brazil and other South American countries, but there are also productions of it in the West and East Indies.

ROSS, Sir James Clark, explorer, born in London, England, Feb. 15, 1800; died April 3, 1862. He was a nephew of Sir John Ross, entered the navy in his twelfth year, and accompanied his uncle on two voyages to the Arctic Sea. In 1831 he discovered the north magnetic pole and was made post-captain. He commanded an expedition to Baffin Bay in 1836, and three years later made a voyage to the Antarctic seas, approaching within 160 miles of the south magnetic pole. Ross discovered the volcano Mount Erebus in 1841, and gave the region the name of Victoria Land. In 1843 he returned to England, where he was knighted, and in 1848 made an unsuccessful search for Sir John Franklin in Baffin Bay. He published "Voyage of Discovery in Southern Seas."

ROSS, Sir John, Arctic explorer, born at Valsarroch, Scotland, June 24, 1777; died Aug. 30, 1856. He was the son of a minister, and entered the navy when but ten years old, serving fifteen years as midshipman. In 1818 he became captain, and accompanied Parry on an expedition to the Arctic regions, the aim being to explore Baffin Bay and find a northwest passage. He commanded an expedition to the same region in 1829, when he discovered the peninsula of Boothia Felix, and on his return to England was knighted. He became consul at Stockholm in 1838, and was made rear-admiral in 1851. Among his writings are "Treatise on Navigation by Steam;" "Residence Region," and "Letters to Young Sea Officers."

ROSSETTI (ros-sĕt'ee), **Dante Gabriel**, painter and poet, born in London, England, May 12, 1828; died April 10, 1882. He was the eldest son of Gabriele Rossetti, studied at King's College, and in 1848 joined Hunt, Millais, and others in establishing the brotherhood of Pre-Raphaelites. He exhibited his beautiful "Girlhood of the Virgin" in the free exhibition in 1849, and later produced many works of merit, a number being exhibited the year after his death at the Royal Academy. His principal pantings include "Dante's Dream;" "Venus Verticordia," and "Salutation of Beatrice." His poetical writings are better known and appreciated than his paintings, some having been widely translated. The principal poetic works include "Hand and Soul;" "House of Life;" "Dante at Verona," and "King's Tragedy and Other Ballads." His brother, William Mitchel Rossetti, born in London, Sept. 25, 1829, is noted as a poetical writer. After studying at King's College, he entered the English civil service, and joined his brother and others in the promotion of Pre-Raphaelitism. His principal writings include "Collected Works of Dante Gabriel Rossetti;" "Lives of Famous Poets," and "Wives of Poets." He edited "Selections from the Poems of Walt Whitman," and lectured on art.

ROSSETTI, Gabriele, eminent author, born in Vasto, Italy, Feb. 28, 1783; died in London, April 26, 1854. He studied in the University of Naples, but the unusual political excitement then prevailing caused him to flee as a refugee to England in 1824. There he devoted himself to a studious literary career and published a number of works of merit. He was professor of Italian literature in King's College, London, and an influential lecturer for many years. His principal works include "Commentary on Dante;" "Beatrice and Dante," and "Poetry of Gabriele Rossetti."

ROSSINI (ros-see'nee), **Gioachino Antonio**, dramatic composer, born in Pesaro, Italy, Feb. 29, 1792; died Nov. 13, 1868. He was the son of a strolling player, and entered the Lyceum of Bologna in 1807, where he studied with great industry. It may be said that he was largely self taught, since he gave all his leisure time to the study of Italian and German masters. His first musical production, "Tancredi," was played at Venice in 1813, and possesses such merit that he at once rose to fame and honor as a composer. He visited Berlin, Vienna, and London in 1824, and in the same year settled at Paris, where he became connected with the Italian theater the following year, holding a high-salaried position till 1830. Later he resided at Bologna and Florence, but returned to Paris in 1855, where his death occurred. His body was removed to Florence in 1887. Rossini attained great popularity and wealth. His principal productions include "William Tell;" "Barber of Seville;" "Semiramide;" "Othello," and "Stabat Mater."

G. A. ROSSINI.

ROSSITER (rŏs'sĭ-tẹr), **Thomas Pritchard**, painter, born in New Haven, Conn., Sept. 29, 1817; died May 17, 1871. He studied art in a studio of his native city, where he afterward established an art gallery, and in 1840 went abroad. After studying and practicing his art in Rome, Paris, and other European cities for six years, he returned to open a studio in New York. In 1853-56 he went abroad a second time, and in the latter year won a gold medal at the Paris exposition. He returned to the United States in 1856, and soon after settled permanently in Cold Harbor, New York, where he died. His best known paintings include "Venice in the 15th Century;" "Return of the Dove to the Ark;" "Home of Washington," and "Wise and Foolish Virgins."

ROSTOCK (rŏs'tŏk), a city of Germany, in Mecklenburg-Schwerin, on the Warnow River, sixty miles northeast of Lübeck. It is six miles from the Baltic Sea, has a good harbor, and is connected with interior Germany by important railroads. Rostock has an active trade in cereals, live-stock, fish, timber, salt, and merchandise. The principal manufactures include leather, cotton and woolen goods, chemicals, machinery, pottery, lime, toys, and clothing. Its celebrated university was founded in 1419. This institution has fifty professors and lecturers and a library of 25,000 volumes. Among the numerous churches are St. Mary's and St. Peter's. It has excellent public schools and hospitals and several academies. Electric lights, street railways, waterworks, and street pavements are among the improvements. Rostock is the birthplace of

Blücher, and contains a colossal monument to that eminent military leader. It was an important member of the Hanseatic League. Population, 45,780.

ROTHSCHILD (rŏs'chīld), the name of an eminent family of bankers, so named from Zum Rothen Schilde, meaning To the Red Shield, the sign of the house in which their ancestors lived in Frankfort, Germany. Mayer Anselm, the founder of this great financial house, was born in Frankfort-on-the-Main in 1743, and died in 1812. He was a German of Jewish extraction, and was the first to assume the name of Rothschild. After receiving an education for the position of a rabbi, he won the confidence of the landgrave of Hesse, who intrusted him with the care of $5,000,000 during the French invasion of 1806. He was allowed the free use of this vast sum, and by putting it out at interest not only prevented the French from securing it, but he was enabled to lay the foundation for the great wealth now possessed by his posterity. Afterward he associated his sons with him in the banking business, and the family has since been connected closely with the financial affairs of Europe. His five sons were the financial kings of Europe at the time of his death, and they and their descendants have continued to gain in wealth and influence ever since. Anselm Mayer von Rothschild (1773-1855) became the head of the Frankfort bank. The others were established at different financial centers as follows: Solomon Mayer (1774-1855), at Vienna; Nathan Mayer (1777-1836), at London; Karl Mayer (1788-1855), at Naples; and Jacob Mayer (1792-1868), at Paris.

Frankfort is the common center of the Rothschild system of banks, and no business of magnitude is transacted without communicating with headquarters. The business consists mainly of making loans on a large scale, such as those negotiated by governments, railroad companies, and corporations looking forward to the building of canals and other great enterprises. However, the company also does a general banking business. A splendid example of their ingenuity is seen in their employment of swift-sailing boats, carrier pigeons, and telegraphic communications for the purpose of ascertaining the fortunes of battles in the time of great conflicts, thus enabling them to turn their speculative enterprises to good account. An enterprise of this kind conducted by Nathan Mayer in connection with the battle of Waterloo gave the banking house information of the great contest several hours before it reached England, and from this fact the institution gained about $1,000,000. Austria created the five brothers barons in 1822, and several members of the family have been similarly honored in Germany and England. Linel Nathan (1808-79) was the first Jew to enter parliament (1858), and his son, Baron Nathaniel von Rothschild (born 1840) was made a peer in England in 1885. A large number of hospitals and educational institutions have been endowed by different members of the family.

ROTTERDAM (rŏt'ẽr-dăm), an important riverport of Holland, the second city of the kingdom, forty-five miles southwest of Amsterdam. It is situated on both sides of the Maas River, fifteen miles from the North Sea, and is intersected by a splendid system of canals, thus giving it advantages of vast importance. It has extensive electric railway and railroad facilities. Its trade is the most important of Holland, aggregating annually a vessel tonnage of 13,750,000 tons, a figure excelled by only a few cities of the world. The export trade is principally in manufactured goods, provisions, mineral waters, and spirits; while the imports consist of cotton, coffee, spices, sugar, and dyewoods. Among the extensive manufactures are beet-sugar, ironware, jewelry, cotton and woolen goods, soap, vinegar, liquors, sailcloth, windmills, and machinery. The city is supplied with electric and gas lights, pavements, sewerage, waterworks, and rapid transit. It has numerous gardens and parks, charitable and educational institutions, and many fine monuments. The St. Laurence Church is a Gothic structure of the 15th century, and the Museum Boijmans is a celebrated building partly destroyed by fire in 1863. In the Great Market is a bronze statue of Erasmus. Other statues are dedicated to Tollens, De Witt, and Admiral Kortenaar. The docks and quays are extensive, and the river and canals are crossed by numerous bridges. Rotterdam was founded in 1416. Population, 320,140.

ROUBAIX (rōō-bă'), a manufacturing city of France, in the department of Le Nord, six miles northeast of Lille. It is a modern city, coming into importance in the last century. The Roubaix or La Marca canal furnishes connections with the Scheldt River in Belgium. It has modern municipal facilities, extensive railroad connections, and an important trade. The manufactures embrace cotton textiles, woolen and silk goods, beet-sugar, carpets, leather, and machinery. Population, 115,822.

ROUEN (rōō-ĕn'), an important city of France, formally capital of Normandy, on the Seine River, eight-six miles northwest of Paris. It is a beautiful and modern-appearing city, has excellent railroad and navigation facilities, and enjoys an extensive domestic and foreign trade. The river has been improved so sailing vessels of the largest kind can reach it successfully, and it has a spacious and well improved harbor. It is provided with modern municipal facilities, such as telephones and electric street railways, and has excellent educational advantages, and numerous hospitals and churches. The public library contains 125,000 volumes, and there are an extensive museum of antiquities, a cathedral of Gothic architecture, and a number of institutions of

higher learning. Among the manufactures are silk textiles, cotton and woolen goods, cordage, chemicals, hats, paper, hardware, lace, ribbons, sailing vessels, and machinery. The Northmen took possession of Rouen in 843, and in 1066 it served as the residence of the duke of Normandy, who in that year conquered England and established his court in London. Joan of Arc was burned there in 1431, and the spot is now commemorated by a beautiful statue dedicated to her. German troops occupied Rouen in the war of 1870-71. Population, 112,975.

ROUMANIA (rōō-mā'nĭ-ą), a kingdom of Europe, surrounded by Bulgaria, Servia, Austria-Hungary, Russia, and the Black Sea. It has an area of 48,307 square miles, about as large as Alabama. The western part is mountainous, being traversed by ranges of the Carpathians and the Transylvanian Alps, but it lies exclusively in the Danube basin. The drainage is toward the south and east into the Black Sea. Most of the southern boundary is formed by the Danube River, which turns northward near Silistria, and after being joined by the Pruth it forms the boundary between the province of Dobrudja and Russia. The greater part of the Danube delta is thus included with Roumania, and it also contains the celebrated wall built by the Roman emperor, Trajan, in the 2d century, from the vicinity of Rustendji to the Danube. Its climate is subject to marked extremes, having a hot and rainless season in late summer and an intense winter, but a long and pleasant autumn.

Roumania has a remarkable growth of forests and fertility of soil, while mineral wealth is abundant, including petroleum, salt, iron, coal, and lignite. The products include mainly fruits, wheat, rye, barley, maize, tobacco, oats, hemp, vegetables, and vines. It has growing interests in the rearing of horses, cattle, swine, sheep, and poultry. Manufactured articles are the principal imports, but manufacturing enterprises have been planted in many of the cities under government protection and are in a state of rapid development. Railroad building was begun under government ownership in 1869, and there is at present a total of 2,125 miles of railway lines owned by the state, while transportation facilities are extended greatly by navigation on the Black Sea and the Danube River. The lands were almost exclusively under feudal ownership from remote antiquity till 1864, when the government provided a popular loan from its resources to the people. Under it peasants have come in possession of small farms, consisting mostly of ten-acre tracts, and the loan is being rapidly repaid under an installment system with low interest.

Roumania includes the three provinces of Moldavia, Wallachia, and Dobrudja. The first two were long provinces of Turkey, but in the Russo-Turkish War of 1877-78 they sided with Russia and secured an independent government. The treaty of Berlin, in 1878, recognized the independence of the two united provinces, and approved the annexation of Dobrudja, in return for which Bessarabia was ceded to Russia. In 1881 the country became a constitutional kingdom under Carlo I. The legislative branch is constituted of a senate of 120 members, elected for eight years, and a chamber of deputies of 183 members, elected for four years. Its army is modeled on the German system. It has a peace footing of about 46,000 and a war footing of 160,000 men. The navy consists of twenty-five vessels. At present the language is constituted of many dialects, but they may be classed generally with the Romance tongues. The Jewish population is 425,000; Gypsy, 200,000; Bulgarian, 110,000; German, 75,000; Magyar, 50,000, and Greek, 15,500. The remainder are Roumanians, who call themselves Romani, and are descendants from a colony of Romans established by Trajan. At present the population is placed at 5,915,000, of which 70 per cent. are engaged in agricultural pursuits. Education is still backward, but the government is exerting its functions to secure general educational facilities by establishing a popular free school system, at which attendance has been made compulsory. There are universities at Bucharest and Jassy, with secondary schools in many of the cities and towns. Religious worship is free, but practically the entire populace belongs to the Greek Catholic Church. Membership in the Hebrew Church is estimated at 300,000, Roman Catholic at 150,000, Mohammedan at 30,000, and in the Protestant churches at 25,000.

The region now included in Roumania formed part of Dacia in ancient times, and was made a province of Rome in 106 A. D. by Trajan, when extensive Roman colonies were established. It was overrun by the military hordes of barbarians, including the Goths, Huns, Bulgars, and Slavs, in the early centuries of our era, all leaving traces of their occupation on the people and architecture to the present time. The Bulgarian kingdom annexed it in the 9th century, but it was joined to the Eastern Roman Empire in 1019, and soon after became a part of Turkey. Turkish occupation was disturbed at various times by insurrections and wars, and with the beginning of hostilities between Russia and Turkey, in 1768, Turkish influence began to wane. This may be attributed to the fact that both the Roumanians and Russians belong largely to the Greek church, and Russia claimed a protectorate over its fellow Christians against Turkish atrocities committed in the Balkan region. The Crimean War was followed by the treaty of Paris, in 1856, which, while recognizing the suzerainty of Turkey, added a part of Bessarabia to the principalities of the Danube and made ample provision for maintaining

the rights and privileges of the Balkan states. Moldavia and Wallachia were united under one ruler in 1858, and three years later a national union was formed under a prince. At the beginning of the Russo-Turkish War, in 1877, Roumania permitted the free passage of Russian troops across its territory with the understanding that the scenes of hostilities were to be as much as possible outside the limits of the principality. This action at once led Turkey to proclaim the Roumanians rebels, when they organized their military forces and with an army of 32,000 men under General Cernat assisted in the siege of Plevna. Since then it has constituted an independent hereditary monarchy. Bucharest is the capital and largest city. Other important cities are Jassy, Galatz, Ployesti, and Braila.

ROUMELIA (rōō-mē'lĭ-ȧ), a region of southern Europe, extending from the Black Sea to Albania, and from the Balkan Mountains to the Ægean Sea. The name has been applied in different times to an area differing greatly in extent owing to the fortunes of war, but it refers generally to the country between the Balkans and the Ægean Sea corresponding to ancient Thrace and most of Macedonia. Eastern Roumelia long formed a part of Turkey, but by the treaty of Berlin, in 1878, its government under Turkey became autonomous, and the following year it united with Bulgaria, of which it is now an integral part. See **Bulgaria.**

ROUSSEAU (roo-sō'), **Jean Baptiste,** eminent lyric poet, born in Paris, France, April 10, 1670; died in Brussels, Belgium, March 17, 1741. He was the son of a shoemaker, and after attending several educational institutions in Paris, he began to write lyric poetry for the theater. Later he wrote a large number of songs and epigrams, many of which have passed down to the present time and still hold their popularity. Rousseau was banished from France in 1712 for making a charge against a contemporary writer, having previously been convicted of libel. Subsequently he lived in Switzerland most of the time, but afterward settled at Brussels, where he formed the acquaintance of Voltaire. His complete works were collected and published in 1820.

ROUSSEAU, Jean Jacques, distinguished French author, born in Geneva, Switzerland, June 28, 1712; died in Paris, France, July 2, 1778. He descended from a French family that had settled in Geneva a century before his birth as Protestant refugees. His father, Isaac Rousseau, was a watchmaker, and his mother died shortly after his birth. He was tenderly cared for in infancy by a sister of his father, and at the age of ten years was placed under the care of a Protestant minister at Bossey, where he remained two years, and in 1725 became apprenticed to an engraver in Geneva. As a youth Rousseau was studious, but he soon formed undesirable habits for want of a fixed home, especially while under the care of the Geneva engraver, a violent and harsh man. In 1728 the impulsive youth fled from the real or fancied severity of his principal and found a home with Madame de Warens, who resided at Annecy. She sent him to a charity school in Turin. While at this institution he embraced Catholicism, and afterward again made his home with Madame de Warens. He went to Paris in 1741 to seek his fortune, where he earned his livelihood as a clerk and in copying music, but in 1743 was made secretary to the French ambassador at Venice. Two years later he resigned and returned to Paris to engage as a musical copyist, and also to become a student of sciences. After forming the acquaintance of Grimm, Vasseur, Diderot, and D'Holbach, he began to write for Diderot's "Encyclopedie."

In 1750 the attention of Rousseau was attracted to a prize offered by the Academy of Dijon for the best essay on the question "Has civilization tended to improve the morals?" and wrote the essay that secured the prize. In it he took the position that civilization has not only failed to purify manners, but has been the cause of much misery and crime afflicting mankind. His next writing consisted of an operetta, in 1752, to which he wrote the music, and followed it by a publication called "Letters on French Music." He returned to Geneva in 1754 and again embraced Protestantism, but went back to Paris soon after to devote the remainder of his life almost exclusively to literary work. His writings are principally of a political character and exercised a remarkable influence in forming public opinion to hasten the French Revolution. Among the views expressed by him are the belief that monarchy is a form of tyranny, that all men are born equal, that the possession of vast property is a crime to society, that the soil is the common heritage of all, and that religion is largely superstitious and traditional. France being in a state of revolution and change, Rousseau was compelled to flee to Neuchatel and other places for safety, and in 1766 he proceeded to England, where he formed the friendship of Boswell and Hume. In 1767 he returned to France and supported himself by writing and copying music, but lived in great poverty until his death.

Three works of Rousseau are noted particularly for their widespread effect upon public opinion and the trend of public thought, though to us they appear rather sentimental, a fact to be attributed to the particular characteristics of his age. The first of these is "New Heloise," a romance that appeared in 1760. It awakened an enthusiasm for a return to nature in the recognition of rights and training of children. His remarkable work, entitled "Social Contract," is the second of these, which supplied the govern-

mental theories of the French Revolution, and had a marked influence on the public thought of America. It announced that laws are not binding unless agreed to by all the people, suggested the word citizen, and supplied the cry of "Liberty, Equality, and Fraternity" for the French Revolution. The "Emile" is his third great work, in which he dealt with educational ideas that fell upon fruitful ground, and commended themselves to the study of such eminent teachers as Pestalozzi and Fröebel. Many of the details of his plan of education appear fanciful, but this work was the means of turning the hearts of the parents to the children, and awakened in them a vivid idea of the importance and value of family life and parental care. He deprecated the practice of fashionable mothers committing their own children to the care of peasant foster-mothers, instead of nursing their babes, while his whole ideal of education is democratic instead of aristocratic. This work is read and quoted largely by teachers and educational writers. Other works from the pen of Rousseau are "Discourse on Arts and Sciences;" "Letters from the Mountain;" "Confessions;" "Rousseau's Dream," and numerous criticisms and musical productions.

ROUSSEAU, Lovell Harrison, lawyer and soldier, born in Lincoln county, Kentucky, Aug. 4, 1818; died Jan. 7, 1869. His education was limited to the common schools, but later he studied law, and became a member of the bar in 1841. He was a member of the Indiana legislature in 1844-45, became a member of the state senate in 1847, and soon after organized a company of Indiana troops for the Mexican War, serving under General Taylor in the battle of Buena Vista and several others. After the close of the war he established a criminal law practice in Louisville, Kentucky, where he became a member of the state senate. In 1861 he entered the Union army for service in the Civil War, and as brigadier-general commanded at the battles of Shiloh and Perryville in 1862. He was soon after made major-general of volunteers, and commanded a division of the army of the Cumberland at Stone River, Chattanooga, and Chickamauga. In 1865 he became a member of congress from Kentucky, and in 1867 was breveted major-general and sent to Alaska to assume control of the territory purchased in that year from Russia. He was assigned to the command of the department of Louisiana in 1868.

ROUSSEAU, Pierre Etienne Theodore, landscape painter, born in Paris, France, April 15, 1812; died Dec. 22, 1867. He was the son of a tailor, and studied in the Ecole des Beaux-Arts. Later he traveled extensively to study landscape and sky effects, and in 1834 made his first exhibit at the Salon, where he received gold medals in 1849 and 1854. He was decorated with the cross of the Legion of Honor in 1852. Many of his works are highly meritorious on account of their excellent properties, exhibiting trueness to nature. His landscapes are among the best, and include "Early Summer Morning" and "Alley of Chestnut Trees."

ROWAN (rō'ăn), **Stephen Clegg**, naval officer, born near Dublin, Ireland, Dec. 25, 1818; died in Washington, D. C. March 31, 1890. He came to the United States at an early age, studied at Oxford College, Ohio, and entered the United States navy as midshipman in 1826. After entering the military service, he assisted in the capture of Monterey and San Diego, in 1846, in the Mexican War, and in 1855 became commander. He served on the Potomac in 1861, and the following year commanded the fleet on Roanoke Island, securing the captaincy for capturing Fort Macon. In 1862-64 he commanded the New Ironsides off Charleston. He was voted thanks by congress soon after, and in 1866 promoted to rear-admiral. In 1872 he was made commander of the naval station at New York, president of the board of examiners in 1879, and superintendent of the naval observatory in 1882.

ROWAN TREE. See **Mountain Ash.**

ROYAL SOCIETY, The, an association for the advancement of mathematical and physical science, whose charter name is Royal Society of London for Improving Natural Knowledge. It is the oldest scientific society in England, founded in 1660, and thus is one of the oldest in Europe. Weekly meetings are held from November to June for the purpose of discussions, which are preceded by the reading of papers on scientific subjects, after which the discussions are general. The "Philosophical Transactions," founded in 1665, is an annual in which the more important papers and proceedings are published, and "The Proceedings," first issued in 1880, is a periodical devoted to publishing abstracts of papers and accounts of general transactions. Fellows are elected by the members, the election occurring annually. The society is supported by an endowment, and additional support is secured by each fellow contributing annually $20, or a life payment of $300. The membership comprises about 550 fellows, and since its organization nearly all the eminent men of Great Britain have been enrolled. Its presidents have included Sir Isaac Newton, Samuel Pepys, Sir Hans Sloane, Sir Jay Banks, and Sir Humphry Davy.

RUBBER. See **India-Rubber.**

RUBENS (rōō'bĕnz), **Peter Paul**, eminent painter, born at Siegen, Germany, June 29, 1577; died in Antwerp, May 30, 1640. He was the son of a lawyer, who died in 1579, and his mother took him to Antwerp in 1587, where he studied in a Jesuit institution. His ability for painting began to be noticed at an early age by his aptness to

produce drawings and sketches, and he began to study art systematically in 1590. He became a master of the guild of painters in Antwerp in 1598, and produced a number of paintings that attracted wide attention. In 1600 he proceeded to Italy to study and practice his art, spending his time mostly as court painter to the duke of Mantua. On returning to Antwerp, he was made court painter to Archduke Albert with a good salary, and soon after married Isabella Brant. Subsequently his time was devoted to the production of the masterpieces that have made him famous. Marie de Medici invited him to France in 1621, where he designed a series of pictures illustrating the life of that princess, which were placed in the gallery of the Luxembourg. On returning to Antwerp he was sent by Archduchess Isabella of the Netherlands on a mission to Spain to negotiate a peace treaty with Philip IV., and in 1630 was sent on a similar mission to England to treat with Charles I.

After accomplishing these missions, Rubens painted the portraits of the king and queen, and many of the noted men of England. Charles I. of England and Philip IV. of Spain both knighted him. His wife, Isabella, died in 1626, and in 1630 he was married again, his second wife being Helena Fourment. Rubens accumulated a large fortune. He was a man of strongly marked character, and his excellent and large number of productions place him at the head of the Flemish school. His paintings include landscapes, portraits, Bible subjects, historical views, and animals of all kinds. All his works are noted for their brilliancy and natural effect, many of them selling at enormous prices. Among his most noted paintings are "Elevation to the Cross;" "Descent from the Cross;" "Mercury and Psyche;" "Adoration of the Magi;" "Assumption of the Virgin;" "Massacre of the Innocents," and "Blessings of Peace." The works of Rubens are placed at about 2,500. His remains were buried in a private chapel called the Church of St. James, in which many of his magnificent paintings may be seen, and where a monument to him has been erected.

RUBICON (rū'bĭ-kŏn), a river of northern Italy, which flows into the Adriatic. It is of interest historically in connection with Cæsar crossing the stream with an army in 49 B. C. The Rubicon was the boundary line that separated his province from the republic of Rome, and crossing it with an army at the outbreak of the civil war between him and Pompey constituted a declaration of war. Writers represent Cæsar as hesitating before crossing the stream, and while passing over he is said to have uttered the words "Jacta est alea," meaning "the die is cast." "Crossing the Rubicon" has since passed into a proverb, and signifies the undertaking of a hazardous task. It is thought that the Rubicon is the river now known as the Fiuminico.

RUBINSTEIN (rōō'bĭn-stīn), **Anton Gregorievich**, eminent composer and pianist, born in Wechwotynetz, Roumania, Nov. 30, 1830; died in Peterhof, Russia, Nov. 20, 1894. He descended from a German family of Jewish extraction, and after receiving his first musical instruction from his mother, he studied at Moscow, Paris, and Berlin. While at Paris he was instructed by Liszt and at Berlin by Dehn. After completing his studies in Berlin, he taught music in Vienna and later in Berlin, and in 1848 settled in St. Petersburg. In 1857 he made a tour through Europe, and the following year became conductor of the Imperial Concert, with a life pension, in St. Petersburg, where he founded a conservatory of music in 1862. He visited the United States in 1872-73, meeting with enthusiastic receptions. Many sovereigns of Europe granted him distinguished honors, he receiving among others the Legion of Honor in 1877, and a grand jubilee in St. Petersburg in 1889. Rubinstein was prolific as a composer and masterful as a player. He differed materially from Wagner. In feeling he favored Mendelssohn, and in style was quite like Schubert. Among his best known productions are the two sacred operas, "Paradise Lost" and "Moses;" the symphonies entitled "Ocean" and "Dramatic," and the operas entitled "Demon" and "Maccabees." He published "Autobiography of Anton Rubinstein" in 1890.

RUBY, a transparent gem of a deep red color, which is considered one of the most valuable of the precious stones. It is a variety of sapphire, but differs from it in that the latter is of a bluish color and less hard, ruby being the hardest of all gems except the diamond. Ruby is rare and seldom found of large size, and possesses great value. Its value increases in proportion to its size; a ruby of five carats, if perfect in color, is valued at about ten times as much as a diamond of the same weight. Ruby of the kind described here is generally called oriental ruby to distinguish it from a less valuable variety known as spinel ruby. The former kind is a corundum formed largely of alumina, while the latter is an aluminate of magnesium, and is inferior both in value and hardness. Jewelers often offer for sale articles of ornament containing spinel rubies, the oriental variety possessing a value too great to be generally purchased. Rubies are obtained in Burmah, Siam, Ceylon, and Australia. Inferior varieties occur in America and also in the countries named. It is now possible to produce rubies chemically. The artificial kinds serve the purpose in watches equally well to rubies produced in nature.

RUDDER, a broad, flat device by which a boat or ship is steered, serving to change its course when swung to either side. It is hinged vertically to the stern post of a ship, or at the stern of a boat, and is so adjusted

that it may be moved by means of a tiller or wheel. A rudder chain is shackled to the rudder by bolts just above the water line, but it is slack enough to permit the free motion of the rudder. This is necessary to prevent it from being lost in the event of its becoming detached from the ship.

RUFF, a genus of wading birds allied to the sandpiper. They are found widely distributed in the northern parts of North America and Eurasia. They inhabit marshy places, and are migratory in their habits. Their length is about twelve inches; the colors are various, though generally variegated brown or black above and white below. In all species the bill is long and slender, and the wings are short. The male is peculiar for having a long ruff, formed of feathers, around the neck in the spring, which disappears after two months, but serves during the breeding season as a defense when fighting against other males. The fights occurring at that time are for the possession of the females, which are smaller than the males, and are called reeves. Ruffs feed on worms, seeds, and insects. They breed in the coarse grasses of marshes and swamps, where they construct nests in the early spring, the brood usually consisting of four. Their flesh is edible and much sought in the fall.

RUFF.

RUGBY, a town in England, on the Avon River, fifteen miles northeast of Warwick. It is surrounded by a fertile country, has excellent railroad facilities, and is noted as the seat of the celebrated Rugby School. This institution was founded by Laurence Sheriff, a grocer and merchant to Queen Elizabeth, in 1567. It first attained a national reputation when Dr. Thomas Arnold became master in 1828. Its endowments produce about $25,000. It is attended by about 500 students. Among its famous students were Lord Derby, Matthew Arnold, Dean Stanley, and Thomas Hughes. The last named wrote "Tom Brown's School-days," a book still purchased largely for home and school libraries. The town of Rugby has a number of excellent churches, hospitals, and associations. It has railroad facilities and a considerable trade. Population, 13,840.

RUGEN (rü'gen), an island in the Baltic Sea, off the coast of Pomerania, from which it is separated by a narrow channel. It is thirty-three miles long, about ten miles wide, and has an area of 390 square miles. The shore is very irregular, being indented by numerous bays, and its surface is generally undulating and fertile. It has no prominent elevations. Stubenkammer is the highest point, being a precipitous chalk cliff 410 feet above sea-level. The principal productions include vegetables, cereals, and fish. Cattle and sheep are reared. A number of the coast towns are noted as popular resorts for sea-bathing and sight-seeing. Bergen is the chief town and seat of local government, and has a population of 5,850. The island belonged to Sweden till 1815, when it became a part of Prussia. It is now an integral part of the German Empire. Population, 52,599.

RUM, an alcoholic liquor distilled from the juice of sugar cane, and from the drainings and scummings obtained in sugar making. The material used is first allowed to ferment, and the liquor is then drawn off by a simple process of distillation, which is usually conducted in connection with the cane-sugar establishments. The best grade of rum is secured from the scummings taken from the sugar pans; a second grade is made from scummings and molasses, and an inferior grade from molasses alone. Rum is colorless as it issues from the still, but it is colored to suit the customer before it leaves the premises of the distiller. The most extensive productions are in connection with the manufacture of cane sugar in the West Indies and Central America, but inferior grades are made by flavoring plain spirit with rum and coloring with burnt sugar. Jamaica rum is considered the finest, but in late years the name has been applied to the best grades made anywhere. A pineapple flavor is often given to rum by bringing it in contact with sliced pineapples, when it is called pineapple rum.

RUNEBERG, Johan Ludwig, eminent Swedish poet, born at Jacobstad, Finland, Feb. 5, 1804; died at Borga, May 6, 1877. He was the son of a sea captain, who provided him with facilities for a good education, which included an extensive research in literature and a knowledge of Greek. In 1830 he was made teacher of Latin literature in the University of Abo, a city of Russian Finland, and later in the Lyceum. Many of his poems show the influence of Goethe and Greek writers, but his originality must be conceded. It may be said that they attained the highest ideal of imaginative literature in Sweden, and reflect the deepest feelings of regard and nationalism manifest by the Scandinavian peoples. Among his best known works are "Elkhunters," an epic idyll; "King Fjalar;" "Christmas Eve;" "Ensign Stals' Stories," and "Hanna."

RUNYON, Theodore, soldier and diplomat, born in Somerville, New Jersey, Oct. 25, 1822; died Jan. 27, 1896. He graduated from Yale University in 1842, was admitted to the bar in 1846, and soon after established a lucrative practice in Newark, New Jersey, where he held several impor-

tant city positions. The state authorities employed him to codify the militia laws of New Jersey in 1856, and soon after he was made major-general of the national guard in that state. He commanded a brigade of volunteers at the beginning of the Civil War, but soon after returned to the law practice. In 1873-87 he was chancellor of state, and in 1893 was appointed minister to Germany by President Cleveland and later ambassador to the same country. Runyon received the degree of law from Yale University, and from Wesleyan and Rutgers colleges.

RUPERT (roo'pert), prince of Bavaria, third son of Frederick V., king of Bohemia, and of Elizabeth, daughter of James I. of England. He was born at Prague, Hungary, Dec. 18, 1619; died in London, England, Nov. 29, 1682. In 1630 he entered the University of Leyden, and afterward took an extensive course in languages and military discipline. He was made master of arts by the Oxford University in 1636. Two years later he took part in the siege of Breda. In the battle of Lemgo the Austrians took him prisoner, when he was confined for three years at Lintz. After being released, in 1642, he proceeded to England, where he was made commander of a regiment in the Civil War by Charles I. His career promised to be of value to the royal cause from the first, since he was daring in leading his army, but he was extremely rash in venturing into battle against great odds. He fought with remarkable activity at Worcester, Edgehill, and Brentford, and routed the Scots at Marston Moor, but was defeated by Cromwell's Ironsides. In 1645 he succeeded in a number of other battles, but was besieged at Bristol and compelled to surrender after a siege of three weeks. Charles became impatient at his losses and had him court-martialed, but he was cleared from blame and reinstated. Rupert won a number of victories soon after, but was captured at Oxford. He sailed to France at the demand of the parliament, where he was made marshal, and after receiving a wound at Armentieres, in 1647, he accompanied the prince of Wales to The Hague.

Charles soon after made Prince Rupert admiral of the fleet for remaining true to the royalists, and he sailed on an expedition of organized piracy against his opponents. However, most of his vessels were destroyed in a battle, and he was defeated by Admiral Blake at Malaga in 1651. He escaped with the remaining vessels to the West Indies, where he was joined by his brother, Maurice, and the two practiced piracy upon English and merchant vessels until 1653, when he returned to France. In 1660 he returned to England, and four years later sailed as commander of a fleet against the Dutch in Guiana, where he gained signal victories and received the thanks of the house of commons. Rupert devoted the later part of his life to scientific study. He is the inventor of a form of gunpowder, and the discoverer of improvements in the art of mezzotint engraving. He was the first governor of the Hudson Bay Company, and from him the curious glass bubbles known as Prince Rupert's drops derived their name.

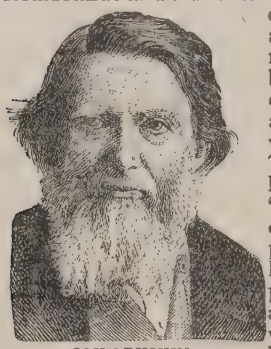
RUPERT'S LAND, an extensive region of Canada, so named from Prince Rupert, who was one of the founders and first governor of the Hudson Bay Company. The region includes what is now Manitoba, Saskatchewan, and a large part of Keewatin. Subsequently it was transferred to the Hudson Bay Company, and in 1870 admitted into the Dominion of Canada. See **Hudson Bay Company.**

RUSH, Benjamin, eminent physician, born in Philadelphia, Penn., Dec. 24, 1745; died April 19, 1813. He descended from a family of Quakers that came to America with William Penn in 1683, and after graduating at Princeton in 1760, he studied two years in Edinburgh, Scotland, where he secured a degree in 1768. Soon after he returned to America. He became professor of chemistry in the Philadelphia Medical College, and at the same time built up a reputation as medical practitioner. In 1774 he joined James Pemberton in founding the first anti-slavery society in America, and became noted as a leading spirit in the political movements preceding the Revolution. He served as a member of the continental congress in 1766, and was a signer of the Declaration of Independence. Until 1778 he was physician-general of the army, and in 1787 sat as a member of the Philadelphia convention that adopted the federal constitution. Rush was versatile as a writer and eminent as a physician. His last public office was that of treasurer of the United States mint in 1799, serving in that position till 1813. Among his numerous writings are "Diseases of the Mind;" "Medical Inquiries and Observations," and "Medical Tracts."

RUSK, Jeremiah McLain, soldier and statesman, born in Morgan county, Ohio, June 17, 1830; died in Viroqua, Wisconsin, Nov. 21, 1893. He was brought up on a farm and attended school in Ohio, but removed to Wisconsin in 1853 and engaged in farming. In 1862 he entered the Union army, serving till the close of the war. He attained to the rank of brigadier-general in 1865. He was bank comptroller of Wisconsin in 1866-70, served as a republican in congress in 1871-77, and was governor of Wisconsin in 1882-89. President Harrison made him secretary of agriculture in the latter year, and at the close of his term he retired to Viroqua.

RUSKIN (rŭs'kin), **John,** prose writer and art critic, born in London, England, Feb. 8, 1819; died Jan. 20, 1900. He was the son of a wealthy wine merchant, and was instructed privately until he entered Oxford University, where he graduated in 1842. While at school he manifested a taste for literature and art. After graduating, he

studied painting under Copley Fielding, and received inspiration from the noted works of Rembrandt and Rubens. His whole life was one of busy study and work, and it may be said to have been quite as uneventful as that of a teacher and writer usually is. The first work from his pen was his "Modern Painters," in 1843, but previous to that he had published his poem on "Salsette and Elephantra," which gained the Newdigate prize at Oxford. In the "Modern Painters" he discussed the principles of art and called attention to the superiority of modern painters to the older masters. This work was published in five volumes, the last appearing in 1860, thus forming a very comprehensive treatise on the subject. He next passed to a study of architecture, which resulted in his "Seven Lamps of Architecture" in 1849, and followed it by his "Stones of Venice," the last volume of the latter appearing in 1853. About that time he lectured on drawing, defended Pre-Raphaelitism, and wrote books on political economy. He made contributions to periodicals, and prepared treatises on social, art, and ethical subjects.



JOHN RUSKIN.

Ruskin lectured at Cambridge a number of years, was professor of fine art at Oxford, and founded St. George's Guild at Oxford, an institution designed to inculcate a habit in young and old to do manual labor. He became the publisher of his own books in 1873, finding it more agreeable to his particular taste in securing just such composition and printing as he desired. It may be said of Ruskin that few lives present greater lessons of industry than his, while few writers have attained to such lofty enthusiasm for truth and beauty. None have shown greater eloquence and force, or exhibited a more generous sympathy for the needy and those wishing to make the best of life. His books are read and studied with enthusiasm both in America and Europe, and have found their way into many school and home libraries. The most noteworthy not named include "King of the Golden River," a fairy story; "Crown of Wild Olive," essays on work; "Sesame and Lilies;" "Pleasures of England;" "Mornings in Florence;" "Ethics of the Dust;" "Elements of English Prosody;" "Queen of the Air;" "Two Paths;" "Poetry of Architecture;" "St. Mark's Rest," and "Arrows of the Chase."

RUSSELL (rŭs'ĕl), **Sir Charles**, eminent jurist, born near Newry, Ireland, in 1833; died Aug. 10, 1900. He descended from a family of Roman Catholics, four of his brothers entering the service of the church. After studying at Dublin University, he turned his attention to law, but in 1851 sought greater possibilities in London. He first engaged as a reporter on several papers, studying law in the meantime, and was admitted to the bar at Lincoln's Inn in 1859. His success was assured by reason of industry and ability, rising to become Queen's counsel in 1872, and in 1880 he became a member of parliament. There he supported the home rule policy of Gladstone in a masterful and influential way, was knighted in 1886, and in 1894 made lord chief justice of England as successor to Lord Coleridge. He visited the United States in 1896, and delivered an address before the Bar Association of America, at Saratoga Springs, New York, on "International Arbitration." Lord Russell ranked as a persuasive and energetic speaker. He presided over the trial of Leander Starr Jameson in 1896, and subsequently over other equally noted cases.

RUSSELL, John, Earl, statesman, born in London, England, Aug. 18, 1792; died May 28, 1878. He was the third son of John, sixth duke of Bedford, studied at the University of Edinburgh, and in 1813 became a member of parliament. His influence became assured from the first by reason of his eminent ability as a speaker. He attracted much attention by an address in opposition to a union of Sweden and Norway. In 1819 he delivered an address in favor of parliamentary reform, a question in which he took special interest during his entire political career, and in 1830 assisted in framing a reform bill. He became home secretary in the second cabinet of Lord Melbourne in 1835, and was made colonial secretary in 1839, introducing many important bills during the period. When Peel began to agitate the corn laws, Russell opposed him with vigor in 1841-45, but in the latter year wrote a letter in favor of repealing the corn laws, which, on being published, caused general discussion in England. Peel resigned in 1846, and Russell formed a new ministry that held power till 1852, its fall in that year being due to a famine and rebellion in Ireland. He entered the office of foreign secretary under Lord Aberdeen the same year, and in 1855 became colonial secretary in the cabinet formed by Lord Palmerston. In 1865 he succeeded to the leadership of the liberal party, but resigned the following year because his new reform bill failed, and henceforth held no office. Russell was not only an eminent leader and statesman, but ranks high as a writer. His principal works include "History of the British Constitution;" "Life of Thomas Moore;" "Recollections and Suggestions;" "Rise and Progress of the Christian Religion in Western Europe;" and "Life and Times."

RUSSELL, William, Lord, patriot and statesman, born Sept. 29, 1639; died July 1, 1683. After graduating from Cambridge,

he traveled in Europe, and in 1660 became a member of parliament. He took little part in public debates until 1673, when he became a recognized leader of the Protestants in England, and subsequently was prominent as an opponent of King Charles and the Catholics. In 1680 he joined others in planning to secure a Protestant king of England, and to retaliate the opposition accused him of being implicated in the Rye-House Plot, but it was afterward learned that he had no knowledge of this or of any plan to raise an insurrection against the king. However, he was arrested on a charge of having plotted against the king, and was accordingly condemned to be executed. Many attempts were made to save his life, but as the king would not yield, Russell himself refused every other means, though an opportunity was given him to escape. His life stands as an example of a Christian martyr. Algernon Sidney, his fellow-victim, was executed before the close of the year.

RUSSELL, William Clark, novelist, born in New York City, Feb. 24, 1844. He descended from an English family, his father being Henry Russell, a favorite concert singer in New York and a composer of songs. The son was educated at Winchester, England, and in France. He began sea life as a midshipman in 1857, and as such made several voyages to Asia and Australia. In 1865 he abandoned naval employment and turned his attention to literature, contributing to several London periodicals, and writing a few novels under a nom-de-plume. His first literary work of considerable merit was a sea tale called "John Holdsworth, Chief Mate." This was followed by other writings of the same character. He served for some time on the staff of the "London Daily Telegraph," which position he resigned in 1887. His writings include "What Cheer;" "An Ocean Tragedy;" "Frozen Pirate;" "A Sea Queen;" "Wreck of the Grosvenor;" and "Romance of a Midshipman." He published a biography of Lord Nelson.

RUSSELL, William Eustis, lawyer and statesman, born in Cambridge, Mass., Jan. 6, 1857; died July 16, 1896. He graduated from Harvard University in 1877, and after attending the Boston University Law School, was admitted to the bar. After establishing a successful practice in Cambridge, he served as mayor four years, and was elected governor of Massachusetts as a democrat for three terms, in 1889, 1891, and 1892. Russell resumed his law practice after the expiration of his term as governor. He was one of the leading lawyers of the state, and contributed to a number of journals and magazines.

RUSSELL, Sir William Howard, journalist, born in Lilyvale, Ireland, March 28, 1821. He studied at Trinity College, was admitted to the bar in 1850, and served as correspondent of the "London Times" in the Crimean War. It was Russell who made public the sufferings of the British soldiers in their winter quarters, which caused the British ministry to be succeeded by one pledged to military reform. He corresponded for the "London Times" from the beginning of the mutiny in India, in 1857. At the time of the Civil War in the United States he corresponded from America, accompanying General McDowell and others. In 1866 he reported the war between Prussia and Austria; in 1870, between France and Germany, and he later accompanied the British army to South Africa to report the events in the Zulu troubles. He was granted the Iron Cross in Germany, the Legion of Honor in France, and in 1895 was knighted by the queen. Among his numerous writings are "Dairy in India;" "Letters from Crimea;" and "My Dairy North and South."

RUSSIA (rŭsh'a), an extensive empire of Eurasia, including a total area of 8,660,394 square miles, of which 2,095,616 square miles are in Europe. It embraces fifty-six per cent. of Europe and all of northern Asia, extending from the Baltic Sea and the Gulf of Bothnia in the west to the Bering Sea and the Sea of Okhotsk in the east. Asiatic Russia comprises about thirty-eight per cent. of Asia. Its general boundary on the north is formed by the Arctic Ocean; east by Bering Strait and the Pacific Ocean; south by the Chinese Empire, Afghanistan, Persia, Turkey in Asia, and the Black Sea; and on the west by Roumania, Austria-Hungary, Germany, the Baltic Sea, the Gulf of Bothnia, and Sweden. Russia includes by far the largest region lying contiguous within a single government, and has a population of 130,575,500, of which 106,500,000 are in Europe. Of the total inhabitants 17,500,000 live in towns and cities. There are fifty provinces in Russia proper, but Russia in Europe includes, besides these, the grand-duchy of Finland, and the ten governments of Russian Poland. Several popular designations are used for convenience in describing particular regions of Russia in Europe. These embrace South Russia, along the northern shore of the Black Sea; Little Russia, immediately north of South Russia; Great Russia, extending through the center from Little Russia to the Arctic Ocean; East Russia, lying west of the Ural Mountains and Ural River; West Russia, bordering on the Baltic and Germany; and White Russia, embracing the northwestern part. Russia in Asia embraces Western Siberia, Eastern Siberia, Turkestan, Northern Caucasia, Transcaspia, Transcaucasia, Kirghiz Steppes, Amur, and the Maritime Provinces. St. Petersburg is the capital of all the Russias and the largest city of the empire.

Russia in Europe includes the vast region lying north of the Black Sea and Caucasus Mountains, and east of Sweden, Germany, Austria-Hungary, and Roumania. Its surface consists chiefly of an immense plain

well watered by numerous rivers and streams. The Valdai Hills form the only elevated region of the interior. They are situated between Moscow and St. Petersburg, forming the important interior watershed, though their average height is only 500 feet, and the most elevated peaks are about 1,200 feet above sea-level. On the eastern boundary are ranges of the Ural Mountains; between the Caspian and Black Seas trend the Caucasus Mountains; and on the southern shore of the Crimea are the Taurida Mountains. Mt. Elbruz, 18,570 feet high, is the most elevated peak of the Caucasus Mountains and of Europe. The highest elevations of the Ural Mountains do not exceed 7,000 feet, and those of the Taurida are not over 4,000 feet.

The inland waters of Russia include a number of valuable lakes, all of which are in the northwestern part, embracing Lakes Onega, Ladoga, Sego, Bieloe, Saima, Ulea, and many others. The White Sea is the principal coast indentation from the Arctic; the Gulfs of Finland and Riga from the Baltic, and in the southern part is the Sea of Azov, while the Black and Caspian Seas are important for supplying navigation facilities. The principal inland waters in Asia, belonging to Russia, include the Aral Sea, and the lakes of Balkash, Baikal, Issyk-kul, and Chany. Most of the drainage is toward the south. The Volga and Ural Rivers flow into the Caspian Sea; the Don, into the Sea of Azov; and the Bug, Pruth, Dnieper, and Dniester, into the Black Sea. The Baltic Sea receives the waters of the Vistula, Niemen, Duna, Soir, Neva, and Narova; and the Arctic receives those of the northern Dwina, Onega, Petchora, and Mezen. Asiatic Russia also has a large number of important rivers, many of them providing navigation facilities. Those flowing into the Arctic include the Lena, Indigirka, Yenisei, and Obi. The southeastern part is drained largely by the Amur, and the southwestern part into inland seas, chiefly by the Oxus and Daria. As a whole, Russia is rich in natural resources and strong as a nation for offensive and defensive purposes. It possesses vast mineral wealth, fertility of soil, extensive forests, and productive fisheries. In some regions are swamps and desert wastes, particularly southeast of the Ural Mountains.

Both the soil and climate of Russia are greatly diversified on account of the immense extent of the empire. In the southern part the climate is favorable to the production of sugar cane, the vine, and other fruits, but there is a gradual decrease in vegetable forms toward the north until in the Arctic regions only slight traces of lichens and mosses prevail. The climate is generally healthful, though it may be said that the summers are hot and the winters extremely cold. Few regions of equal extent have a more fertile soil than is found in the Russian possessions, but there are vast sandy tracts, morasses, and swamps. Much of the arid climate and unproductive surface is in the vicinity of the Caspian and Aral Seas, though there are swamps north of St. Petersburg, and unproductive regions between the Obi River and the Ural Mountains. However, European Russia consists largely of a rich, black loam and fertile soil, and so also does Siberia. The forest regions are boundless and extend far toward the north, but the size of the trees gradually diminishes until along the Arctic Seas only small shrubs are found. It is estimated that fully forty per cent. of European Russia is still covered by valuable forests, including such varieties as birch, larch, fir, alder, oak, hornbeam, and many species of evergreens. Agriculture is the principal occupation of the people, the chief crops being barley, rye, oats, wheat, flax, hemp, tobacco, grasses, and vegetables. It has large interests in the culture of silkworms, cotton, fruits, and shrubbery. Sheep culture is particularly abundant in the arid regions of the Caspian and Ural Seas, where rainfall is not sufficient to insure the maturity of crops, but adequate to the production of excellent pastures. Other domestic animals are cattle, horses, swine, mules, and poultry. Vast interests in raising herds of reindeer are in the northern region, while the Tartars along the Caspian and the inhabitants of Turkestan engage extensively in the raising of camels. Wild animals are still abundant in the forests of the extreme north, including the bear, wolf, elk, wild hog, and wild fowl. The seas, lakes, and rivers are noted for their production of fish, particularly salmon and sturgeon.

Russia is fast taking high rank in the production minerals of all classes. Gold, silver, and diamonds are found principally in the Ural and Altai Mountains; and salt and saltrock occur chiefly in the region from Astrakhan to the Crimea. The coal deposits include both anthracite and bituminous, and are the most extensive found in any country of Eurasia. It has valuable deposits of petroleum, jasper, granite, copper, lead, saltpeter, platinum, iron, manganese, amethyst, lime-stone, and many others. It may be said that Peter the Great was the founder of the manufacturing industry of Russia, and since his time there has been a steady advance in the number of different products and the quantity produced. The principal manufactures include articles of food, iron and steel, cigars, furniture, lumber products, paper, glass, leather, sailing vessels, steam engines, chinaware, textiles, and machinery. Immense tracts of land have been redeemed in south-central Russia by irrigation, while governmental support to the introduction of beet-growing has established the manufacture of beet sugar as an immense industry, the annual production aggregating 2,500,000,000 pounds. Russia is well provided

with means of transportation, including streams navigable for large steamers a distance of 14,250 miles, and for small vessels fully 25,500 miles. There are canal systems uniting the Baltic and White Sea basins, the Baltic and Caspian basins, and the Baltic and Black Sea basins. Railroad building has been correspondingly important, though the railway mileage is less in proportion to the area and population than that of other European nations. The total is placed at 45,000 miles, of which about one-half is owned by the national government, and the remainder nearly equally by private corporations and provinces. The great Trans-Siberian railway, extending from St. Petersburg to Vladivostok, on the Sea of Japan, is counted the greatest railway enterprise in the world, and has a length of 4,950 miles.

Russia has a vast domestic and foreign trade, exporting chiefly grain, flax, sugar, wool, butter and eggs, timber, furs, spirits, and coal. Its imports include machinery, cotton and woolen goods, herring, coffee, fruit, tobacco, olive oil, and textile fabrics. Germany has a material advantage in trade relations with Russia, for the reason that the German language is used very largely by Russian business men, who consequently maintain trade relations with German-speaking countries. There are extensive imports of cotton and cotton goods from the United States, and a large export trade with Austria, Great Britain, the Netherlands, and France. Postal and telegraphic systems are maintained in all parts of the empire where the country is populated, the total mileage of telegraph lines being 95,500, with 5,025 stations. There are thirty-five cities that have a population of more than 50,000, and twelve that have more than 100,000. The chief cities in European Russia are St. Petersburg, Moscow, Warsaw, Odessa, Lodz, Riga, and Kieff; and those of Asiatic Russia are Tiflis, Tashkend, and Baku. Its leading ports include Onega, Archangel, Helsingfors, Reval, Cronstadt, St. Petersburg, Libau, Riga, Odessa, Kertch, Astrakhan, Taganrog, and Baku. Russia adopted gold as the monetary standard in 1899. The ruble is the unit of currency, containing 201 + grains of gold. It is worth 77 cents in United States money. Silver coins are used in fractional currency, and the paper money is based on gold deposits, being exchangeable at par with gold.

The government is an absolute hereditary monarchy, the entire executive, legislative, and judicial functions being lodged in the emperor. Officially he bears the title of emperor and autocrat of all the Russias, czar of Poland, and grand-prince of Finland. He is limited in his rulings only by certain precedents, such as the decree of Emperor Paul in 1796, concerning the succession to the throne, and that of Peter I., requiring the emperor and princes of the blood royal to be members of the Greek Orthodox Church. There are four imperial councils, including the council of state, which has superintendence of legislation, finance, and civil and church administration; the ruling senate, which has executive and judicial functions; the holy synod, which controls matters ecclesiastical; and the committee of ministers, consisting of twelve ministers, such as of public instruction, of war, of internal affairs, of foreign affairs, etc. The provinces or governments of Russia are supervised by a national police. Each has large local powers to manage its municipal, educational, and other general affairs, suffrage being vested for that purpose in the male citizens. Revenues are raised chiefly by issuing trade licenses, through a tariff system, and by the control of a large portion of the railroad, telegraph, and canal business. The government derives an income from the manufacture of tobacco and sugar, which industries are controlled by it. Internal revenue on spirituous liquors and a tax on land are also among the resources.

The Greek Orthodox Church is the national church, which has a membership in Russia estimated at 80,300,000, but all sects are granted freedom of religious worship. There are about 8,250,000 Roman Catholics in Russia; 3,225,000 Jews; 3,150,000 Protestants, chiefly Lutherans; 2,650,000 Mohammedans, and 60,000 Armenians. No general system of public schools has been established, but public schools are maintained in the provinces. Since 1888 the national authorities have been promoting the establishment of common schools, for which purpose grants have been made. Illiteracy is placed at 50 per cent. in the army, which is about the ratio of the people generally. Excellent secondary schools and academies are supported in many of the cities, and twelve noted universities are maintained. These universities have 1,015 instructors, and are attended by 19,500 students. In 1901 the elementary schools had 85,500 buildings, in which 125,500 teachers instructed 4,775,000 pupils. The army of Russia is one of the most powerful in the world, including 896,000 men on a peace footing, while the war footing is estimated at 3,595,000. The navy embraces 215 vessels and 32,950 men and officers. It is the policy of the government to add to the number of vessels until the Russian navy acquires a strength proportional to its army, and if this program is carried out the empire will constitute the most powerful military force of Europe.

The early history of Russia is wrapped in myth and tradition, and nothing definite is known prior to the 9th century. No country in the world has so great a variety of nationalities, but the chief one is the Slavonic. It is thought that eastern Slavs were the ancestors of the Russians, and settled on the north shore of the Black Sea in the early part of the Christian era, but, being

harassed continually by neighboring tribes, they invited Rurik, a Scandinavian, to come and reign over them. It appears that he and two brothers established a government in 862 in the vicinity of Kieff. The name Russes appears to have originated and came to be applied to them from Norman warriors, who served in the army of the Byzantine emperors, from the circumstance that they passed through the country. Olga succeeded to the government in 945, and in 955 she embraced the Christian religion under the patriarch of Constantinople, but in 957 abdicated in favor of her son, Sviatoslaf. The government passed to Vladimir in 980. In the thirty-five years of his reign he fully established Christianity as the religion, founded cities and schools, and built a number of canals and other improvements. At that time Kieff rose as a city quite equal in importance to Constantinople, and his reign is counted the heroic effort of Russian history.

Vladimir was succeeded by his sons, who established a number of principalities, making it possible for the Mongols and Tartars to invade the country under Genghis Khan in 1224 and inflict material damage to its prosperity. Soon after the Russian princes became tributary to the Khan, placing Russia in an unfortunate condition, for the reason that its civilization and industries became retarded, while the peoples in the region of Poland, Livonia, and Lithuania made rapid advancement in both. This condition led the Poles and Teutonic Knights to make invasions from the west, but both Kieff and Novgorod continued to gain in commercial importance and power, the latter being the capital a large part of that period and was an important member of the Hanseatic League. The capital was removed to Moscow in 1328 by Ivan I., whence originated the term Muscovite. In 1481 the Tartars were expelled by Ivan III., surnamed The Great, who ruled in 1462-1505. He married the niece of the last Byzantine emperor, conquered Novgorod, and otherwise extended Russian dominion. Ivan IV., surnamed The Terrible, succeeded to the throne in 1533 and reigned fifty-one years. His armies were everywhere victorious, and after consolidating Russian territory, he became absolute ruler with the title of czar. He began the conquest of Siberia, which was finally annexed to Russia in 1699. The present czar of Russia descended from the house of Romanoff, which came into power in 1613, and since then the empire has grown continuously in strength and commercial importance.

Alexis Michailovitch succeeded to the Russian throne in 1645, reigning till 1676. His reign was made famous by conquering Little Russia and White Russia from the Poles; the Cossacks of Ukraine were compelled to recognize Russian supremacy, but there were serious internal disturbances because of changes made in the liturgy of the Greek Church. However, Russia's greatness may be said to date from the accession to power of Peter the Great in 1689. His reign of thirty-six years was at first shared by his half-brother, Ivan, but he soon obtained absolute sway, made St. Petersburg the new capital, and gave Russia a European rather than a Mongolian tendency. His achievements include the final conquest of Siberia. He annexed Livonia, Ingria, Esthonia, and other territory taken from Sweden by the peace of Nystadt, in 1721, and constructed canals, encouraged agriculture, and instituted manufacturing and mining. He was succeeded by his widow, Catharine I., in 1725, but she died after a reign of two years, and was succeeded by Peter II. The latter was succeeded in 1730 by Queen Anna, the daughter of Ivan, and in her reign the German party became prominent at court. Nothing of importance may be said to have occurred until the accession of Catharine II. in 1762, who reigned till 1796. Within that period Russia conducted successful wars against Sweden, Turkey, Persia, and Poland. The contests resulted in material extensions toward the east, south, and west. This accession of territory was due chiefly to the three partitions of Poland, in 1772, 1793, and 1795, by which nearly two-thirds of that kingdom became incorporated with Russia, and the annexation of the Crimea in 1783.

Freedom of worship gained a wide foothold under Paul I. (1796-1801), but he greatly retarded the progress of learning by excluding foreign publications and establishing a strict press censorship. In the reign of Alexander I. (1801-1825) many important events tended to enlarge Russian influence. These include the annexation of Finland from Sweden, in 1809; the annexation of Bessarabia from Turkey, in 1812; the defeat of Napoleon at Moscow, in 1812; the annexation of part of the Caucasus, in 1813; and the final absorption of Poland, in 1815. Nicholas I. (1825-1855) annexed additional territory from Turkey and Persia, and began the Crimean War. Alexander II. (1855-1881) concluded the Crimean War by the peace of Paris in 1856, by which Russia lost territory on the north side of the Danube and navigation advantages in the Black Sea, but in 1868 it destroyed every vestige of Polish independence. Soon after it annexed all of Turkestan, and in 1877 declared war against Turkey. This war led to the Berlin treaty of 1878, by which Russia regained its advantages on the Black Sea and secured Bessarabia, and the Balkan states became organized as governments separate from Turkey. Alexander was assassinated through the influence of Nihilists in 1881, and Alexander III. succeeded him. The important events of his reign include the famine of 1890-91, and the expulsion of many Jews. It witnessed the beginning of

WINTER PALACE, ST. PETERSBURG.

The scene of revolutionary movements against the government under the leadership of Father Gapon, in 1905.

the great Trans-Siberian railroad in 1892. On the death of Alexander, in 1894, he was succeeded by Nicholas II., a young man of twenty-seven years, who soon after married Princess Alix of Hesse. He celebrated his marriage with much pomp and made it the occasion of pardoning 20,000 state prisoners. His reign has been one of remarkable prosperity in commerce and internal improvements. The country became involved in war with Japan in 1904, owing to Russian advances in the Far East, especially in Manchuria.

The Russian language is a principal member of the Slavonian family of the Aryan or Indo-European tongues, and is the successor of the Old Slavic. It was modified remarkably by the Mongolian conquest in 1224, and by Polish elements being introduced from the west. Modern Russian may be said to date from the time of Peter the Great, but since then many German, Dutch, and French words have been added and the grammatical construction has become modified. The language contains few conjunctions. It is peculiar for the slight grammatical connection between the sentences, but there is a remarkable capacity for forming derivatives and compounds. Its alphabet has thirty-seven letters, which form combinations and sounds difficult for foreign students to learn. The language is spoken in its purest and most grammatical form in Great Russia, of which Moscow is the literary and intellectual center. About forty different languages are spoken in the empire. The chief of these, besides Russian, are the German, Lithuanian, Finian, Turanian, and Persian.

Russian literature may be said to date from the introduction of Christianity by Vladimir in 980. It was in his reign that the first ballads in Russian were written. At that time knowledge began to be disseminated by the monasteries, at which were published numerous treatises on beliefs of the church and a number of historical works. The first writing of note in the Russian is a book of the Gospels that appeared in 1056, but Tartar and Mongol oppression long retarded material literary advancement. In 1560 Makarius published his "Lives of the Saints," the first writing of note after the expulsion of the Mongols and Tartars, and in 1596 appeared Zizania's "Slavic Grammar." Alexei Michailovitch authorized his prime minister to collect Russian laws, which were printed in 1644, and soon after an academy was founded at Moscow. Peter the Great established the Russian language for universal use in public business and communication, and founded many schools, among them the famous St. Petersburg Academy. The writers of the early part of the 18th century were influenced greatly by German and French writers, the most eminent writers of this period being Lomonossov (1711-65). Gerhardt F. Müller, a German writer, established the first literary journal at St. Petersburg in 1755, and Novikov (1744-1818) published a journal called "Painter," through which medium he greatly enlarged the book trade.

Literature became popular in all parts of Russia in the reign of Alexander I., who was a liberal patron of progressive education and greatly increased the number of universities. Since that time other czars have done likewise, and Russian literature in all departments has been enriched by the contributions of native writers as well as by liberal translations from other languages. The most eminent poets of Russia include Alexander Pushkin, Michael Lermontoff, and Baron Delvig; the novelists embrace Feodor Michailovitch, Prince Odojevski, and Count Leo Tolstoi; the dramatists include Nikolaus Polevoi and Nestor Kukolnik; and the historians embrace Michailovoski Danileveski, Vasili Berg, and Professor Pogodin. Russian philosophy was drawn principally from German and English sources, but there are eminent writers in jurisprudence and philosophy, the former including Simonof, and the latter Sokolof. Among the recent publications are "Russian Officials in Past and Present Times," by E. Karnovich, in 1898; "Emperor Alexander I.," by N. K. Shilder; "Dominion of Muscovite Emperors," by Alexei Michailovitch; and "Russian Books," by S. Vengerov, in 1899. Russia possesses some of the largest libraries in Europe, among them the vast collections of books at St. Petersburg and Moscow.

RUST, a disease that affects cereals and many species of grasses. It is due to various parasitic fungi, whose growth is favored by excessive summer heat, by fields illy ventilated, and by excessively rich manures. Wheat-rust is probably the best known. It has a complex life-history, consisting at first of small fungi of one cell, but later passing through various stages and merging into a form of colored dust. Wheat-rust is red or black; that infesting the tobacco plant is brown, and the fungous growth attacking plants of the mustard family is white.

RUST, the coating caused by oxidation on iron and steel, especially under exposure to air and moisture. The term is applied in an extended sense to a film or oxide formed on any metal by corrosion. Bright iron does not rust in an atmosphere comparatively dry, but when it has once formed on the surface, it continues to deepen rapidly, for the reason that condensation of the liquid contained in the air takes effect more easily on a rust-covered surface than on bright metal. Steel and cast iron are less easily affected by rust than wrought iron, because the latter is nearly pure iron and contains less carbon. The surface may be protected against rusting by japanning and galvanizing, or by coating it with plumbago, oil-paint, or zinc. Farmers find it profitable to coat the bright surface of their plows and other implements with varnish, oil, or paint as soon as the sea-

son is over to prevent them from rusting. Rust may be removed from the surface by rubbing with an oiled rag or emery paper.

RUTH, Book of, a book of the Old Testament, which is generally placed between the Book of Judges and Samuel. It gives an account of Ruth, a Moabitess, who was married to Chilion, son of the Hebrews Elimelech and Naomi. After the death of Elimelech and Chilion, Ruth accompanied Naomi to Bethlehem, where she went into the field as a gleaner, but later married her kinsman, the aged Boaz. She became the mother of Obed, and through him the great grandmother of David and the ancestress of Jesus Christ. The Book of Ruth is canonical and comprises a beautiful idyllic composition.

RUTLAND (rŭt'land), a city of Vermont, in Rutland county, sixty miles south of Burlington. It is finely located on Otter Creek, near Killington Peak of the Green Mountains, and has good railroad and street railway facilities. The city is provided with electric and gas lights, excellent public schools, a United States government building and is the seat of several convents and institutes, and a state penitentiary. Among the manufactures are sugar-evaporators, scales, lumber products, monuments, dairy supplies, buttons, hardware, and machinery. Rutland was one of the state capitals from 1784 to 1804. Population, 1900, 11,499.

RUYSDAEL (roiss'dăl), **Jacob**, eminent landscape painter, born in Haarlem, Holland, about 1625; died there March 14, 1682. He first studied and practiced surgery, but later gave his entire time to painting, his earliest works of art bearing date in 1645. His paintings are remarkable for the precision with which objects from nature, such as foliage, animals, and floating clouds, are outlined. He is the originator of a style of composition and a remarkable plan for grouping trees and shrubs. Seven of his etchings are extant, but the number of paintings still in galleries is larger, several being in Berlin, Paris, and London.

RUYTER (rī'ter), **Michael Andriaenszoon**, eminent admiral, born in Flushing, Holland, March 24, 1607; died April 29, 1676. He descended from a family in moderate circumstances, and entered the naval service as cabin boy when only eleven years of age. Careful attention to the duties of a seaman caused him to be promoted a captain in 1635, and he was made rear-admiral in 1645. He served in the East Indies for some years, fought against the pirates off the north coast of Algeria in 1647, and in 1652 commanded a squadron in the war against England. In 1653 he defeated Blake off Dover, and in 1666 commanded in conjunction with Van Tromp against the British fleet under Prince Rupert and the duke of Albemarle, but the battle was not decisive. The following year he destroyed several English vessels on the Medway, and inflicted material damage at Rochester and Gravesend. When the war against Holland broke out, in 1671, he commanded against the allied fleet of France and England, but the results were indecisive. He was sent against the French in the Mediterranean in 1675, where he fought a desperate battle off the coast of Sicily, but died from the result of a wound. Ruyter ranks with the most eminent military men of Europe, and his name has been commemorated by a splendid military monument at Amsterdam.

RYAN, Patrick John, Roman Catholic archbishop, born in Cloneyharp, Ireland, Feb. 20, 1831. After studying in Thurles and Dublin, he entered Carlow College, and was ordained deacon in 1853. He removed to St. Louis, Missouri, the same year, where he studied at Carondelet Seminary, and was made priest in 1854. Faithful and efficient service caused his promotion to the position of coadjutor archbishop of St. Louis in 1872, and he was made archbishop of Philadelphia in 1884. In 1887 he went to Rome in the interest of a university at Washington.

RYE, an import cereal plant. It is native to the Levant, but is cultivated extensively in temperate climates, especially in western Europe. Rye is nearly allied to wheat, but its nutritive qualities are less, being about as sixty-four to seventy-one. It is hardier than wheat, and is adapted to poorer and lighter soils. In most sections of the United States it may be pastured in the early stages of its growth, and ripens earlier than wheat. Rye forms the breadstuff of a large number of people, especially in Russia, Germany, Holland, Sweden, Norway, and Britain. It is used extensively in making whiskey, especially Hollands, and its straw is valuable for stuffing mattresses and collars, and for use in making brick, baskets, and hats. Both winter and spring rye is grown in the United States, where the annual production is 26,500,000 bushels, and represents a value of $14,500,000. New York, Pennsylvania, Wisconsin, Iowa, Illinois, Missouri, Michigan, Minnesota, New Jersey, and Kansas are among the leading rye-producing states.

RYE.

RYE-HOUSE PLOT, a conspiracy planned in England in 1683, by the whig party, with the view of assassinating Charles II. and the duke of York, afterward James II. The scheme was to be executed near a farm called Rye-house as the two returned from the Newmarket races, but they passed the vicinity of the intended attack earlier than was expected, thus frustrating the

scheme. Soon after the plot was discovered and Lords Essex, William Russell, Algernon Sidney, and others were placed under arrest. The first mentioned committed suicide in the Tower, and both Russell and Sidney were beheaded, though neither of the three were in any way connected with the plot. However, Lieutenant-Colonel Walcot, one of the real contrivers of the plot, was apprehended and brought to the block for treason.

RYSWICK, or **Rijswijk** (rīz'wīk), a village of Holland, two miles southeast of The Hague. It is celebrated from the peace of Ryswick, which was concluded there on Sept. 20, 1697. This treaty ended the war waged by the allied armies of Germany, Holland, Spain, and England against Louis XIV. of France on account of the claim of the latter to the French throne, which was recognized by the treaty. France, Spain, Holland, and England signed the treaty on Sept. 20, and Germany on Oct. 30.

S

S, the fifteenth consonant and nineteenth letter of the English alphabet, forming a sibilant, and representing a hissing sound. It is made by placing the front of the tongue against the roof of the mouth above the front teeth, an opening being left just behind the tip, and then emitting the vocalized breath. S has two sounds, known as sharp or hard, and soft or sonant. The former is represented in this, thus, sin; the latter represents the sound of z, as in muse, music, wise. It is silent in some words, as in viscount, aisle, and island.

SABBATH, the seventh day of the week as appointed by the Mosaic law for cessation from labor and the worship of God. It was set apart to commemorate the event that God created the world in six days and rested on the seventh. Keeping holy the Sabbath is enjoined by the Fourth Commandment in Exodus, because of God's having rested after the creation, and in Deuteronomy its observance is demanded because of the deliverance of the Hebrews from Egyptian bondage. Any mention of the Sabbath in the New Testament implies the seventh day of the week, but the Christian fathers in general drew a distinction between the Sabbath and the Sunday as early as the first three centuries. They regarded the Jewish Sabbath as obsolete, and looked upon Sunday as the divinely instituted Lord's day, joyous in its character, making memorable the resurrection of Christ. The Council of Laodicea, in 366, made it plain that Christians are to observe Sunday. The name Sabbath is used by most of the Christians to designate the Lord's day or Sunday, though Jewish writings and those of Adventists and other Christian sects making use of the name imply that Saturday or the Sabbath is meant. The Sabbath was observed with great rigidity in the time of Christ. At that time Jews were not allowed to go from their city a distance greater than 2,000 cubits, about a mile, which came to be called a Sabbath-day's journey. Thus every seventh day was one of rest, while every seventh year was known as the Sabbatical year, in which the lands were not cultivated and the crops and fruits produced became the property of all in common. When the Pharisees denounced Christ as a Sabbath-breaker because he rendered service to mankind, he replied: "The Sabbath was made for man, and not man for the Sabbath: therefore the Son of Man is Lord also of the Sabbath."

SABIN, Henry, educator, born in Pomfret, Windham county, Connecticut, in 1829. After attending the public schools, he entered Amherst College, where he graduated in 1852, and became superintendent of schools in Naugatuck. Subsequently he removed to Iowa, and was city superintendent of the schools at Clinton for ten years. His eminent success as a supervisor and instructor caused his election as superintendent of public instruction for Iowa, in 1887, which office he filled with success eight years, and subsequently engaged in literary work. He was president of the department of superintendence of the National Educational Association in 1892, and chairman of the committee on rural schools in 1895. Drake University and several other institutions granted him degrees. He published many excellent reports on questions relating to public schools, and is the author of "Talks to Young People" and "The Making of Iowa."

SABINE (sa-bēn'), a river of the United States, which rises in northeastern Texas, and after a course of 500 miles toward the southeast and south flows into the Gulf of Mexico. It enters the gulf through Sabine Pass, a bay about eighteen miles long and eight miles wide. The Sabine River forms the principal part of the boundary between Texas and Louisiana. It is a shallow stream and is navigable only for small vessels.

SABINES (sā'bīnz), or **Sabini**, a people of ancient Italy, who occupied a large part of northeastern and middle Italy. Amiternum was their capital, and occupied a place near the present town of Aquila. The Sabines were closely allied to the Latins. They were an important nation before Rome was founded, and it is thought that they occupied the Quirinal Hill, while Romulus built Rome on the Palatine Hill. The Sabines ceased to exist as an independent nation in 290 B. C., when the Romans incorporated them as a part of Rome. History contains many evidences that the population of Rome included an important Sabine element, and that its influences became intermixed with those of Latin origin, both in religious rites and civil institutions. No remains of the Sabine language in the form of inscriptions have been discovered, but coins issued in Rome in an early period give evidence that the Sabine language had a notable influence upon that of the Romans.

SABLE. See **Marten.**

SABLE ISLAND, an island in the Atlantic, situated 110 miles east of Nova Scotia. It has a low and sandy surface, is about twenty-five miles long, and its greatest breadth is five miles. The island is under the government of Nova Scotia. It has two lighthouses, a hospital for shipwrecked persons, and is the occasion of

many disastrous accidents at sea. Valuable fisheries prevail. Vegetation consists chiefly of grasses, peas, potatoes, strawberries, and cranberries.

SACCHARINE (săk'kȧ-rīn), a white crystalline compound derived from coal tar. It was discovered at Johns Hopkins University by Ira Remsen and Charles Fahlberg in 1879. Saccharine is soluble in hot water, ether, and alcohol, and melts at 220°. It is 300 times sweeter than cane-sugar, one grain being perceptible in 10,000 grains of distilled water. Manufacturers of confectionery use it to a considerable extent, especially in Germany, and it is also employed in brewing. It is recommended in some diseases, as diabetes, though it is not considered a food. The name saccharine in an extended sense is applied to any substance having the quality of sugar, such as honey, cane-sugar, glucose, and other saccharine compounds.

SACHS, Hans, noted poet, born in Nuremberg, Germany, Nov. 5, 1494; died Jan. 19, 1576. He learned the trade of a cobbler, and was instructed in singing by a Meistersinger named Lienhart Nunenbeck. Much of his poetic work was done at Munich. His writings include about 6,000 poems, but only about one-fourth are extant. Those in print comprise fifty-three sacred plays, fifty-nine fables, and sixty-four farces. A collection of his works was published in 1872. Two years later a monument was erected to his memory in Nuremberg.

SACKETT'S HARBOR (săk'ęts), a town of Jefferson county, New York, on Black River Bay, eight miles east of Lake Ontario. It is situated at the mouth of Black River, has a good natural harbor, and is a port of entry. In the War of 1812 it was important as a port, and for the building of the frigates Superior and Madison. The British made two attacks upon the place, but they were defeated with a loss of 150 men. It is connected with Watertown by a railway, has a number of fine churches and schools, and is a favorite resort for summer visitors. Population, 1900, 1,266.

SACO (sa'kō), a city in York county, Maine, on the Saco River, about twenty miles southwest of Portland. The city has an excellent public school system, two libraries, and good municipal facilities. It is the seat of Thornton Academy. The Saco River rises in the White Mountains, is 160 miles long, and has two important falls, one of seventy-two feet at Hiram, and one of forty-two feet at Saco. It is crossed at Saco by four bridges, and supplies water power for manufacturing. Among the manufactures are cotton and woolen goods, boots and shoes, lumber products, and machinery. Old Orchard Beach is a popular summer resort, about three miles from Saco. Population, 1900, 6,122.

SACRAMENTO (săk-rą-měn'tō), the largest river in California, which has its source in the northeastern part of the state, where it is called Pitt River for some distance. Its general upper course is toward the southwest, but at Redding it assumes a southerly course. After receiving from the east Feather River and joining the San Joaquin, it flows into the Pacific Ocean through San Pablo and San Francisco Bays. Its entire length is about 500 miles, of which about one-half is navigable for small boats, but steamers of large size ascend as far as Sacramento, about fifty miles.

SACRAMENTO, the capital of California, in Sacramento county, eighty miles northeast of San Francisco. It is finely located on the Sacramento River, which is navigable for large steamers to that city, and has excellent railroad facilities. The streets are regularly platted. They are improved by substantial paving, traversed by electric street railways, and lighted by gas and electric lights. The city contains a large number of beautiful parks and gardens, and has many notable buildings. The most extensive buildings include the state capitol, a fine stone structure costing about $2,000,000, a government building, the county courthouse, the Masonic and Odd Fellows' halls, the Crocker Art Gallery, a Roman Catholic cathedral, and numerous other churches. It is the seat of the Protestant Orphan Asylum, the City Dispensary, the Marguerite Home for Aged Women, the Ridge Home Hospital, the Southern Pacific Hospital, the Children's Day Home, and numerous public schools. Sacramento has a public and a state library, the latter containing 100,000 volumes. Among the manufactures are woolen goods, carriages, flour, canned fruit, lumber products, pottery, railroad cars, and machinery. The city has extensive machine shops, and is the seat of smelting and refining works. It was founded in 1839, but its prosperity dates from the discovery of gold in 1848. In 1854 it was made the state capital. Population, 1900, 29,282.

SACS AND FOXES, the names of two tribes of American Indians closely associated in history. They are of the Algonquin family. The Sacs settled near Green Bay, Wisconsin, on account of being pressed westward by the Iroquois, where they were joined subsequently by the Foxes. Both tribes were courageous as warriors, and were noted as enemies of the French. They assisted the English in most of their wars. In 1712 they made an attack upon Detroit, but were compelled to retreat to Lake St. Clair, where they met defeat. Later they served under Pontiac, and during the Revolution supported the English. The Rock River Sacs aided Great Britain in 1812, and the Foxes aided the English in attacking Sandusky. The Sacs ceded their land in 1816 and became wholly identified with the Foxes, who ceded lands in 1824 and in 1830. In 1832 they fought under Blackhawk to recover a part of their lands, but gave up

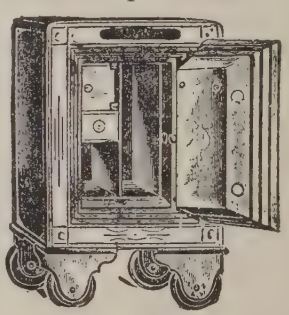
more of their territory in a treaty with General Scott at the close of the Blackhawk War. Later they removed to central Iowa, and in 1842 most of them were removed to the Osage reservation. A party of 325 Sacs and Foxes purchased land at Tama, Iowa, in 1857, which they still occupy and manage with marked industry and intelligence. Settlements of Sacs and Foxes are also in Kansas, Nebraska, and Indian Territory. The two tribes number about 1,000, many of whom are among the most industrious and successful of their race.

SADDUCEES (săd'ŭ-sēz), the name of one of the chief Jewish parties or sects, the other being the Pharisees. They rose among the Jews in the 2d century before Christ, taking their name from Zadok, a priest who declared in favor of Solomon. It is certain that they did not become a party as early as the time of Zadok, but it is thought that some of them were his descendants. All of them admired his fidelity to the theocratic government, and like all other Jews admitted that the Mosaic law was given at Sinai by Jehovah in person. The Sadducees rejected the belief that an oral law of Moses had come from God, and would accept nothing beyond the written word, hence they came to hold three particular doctrines. These include the belief that all the law of God was given in a written form to Moses; that there is no resurrection of the dead with attendant rewards and punishments in the future world; and that there are neither angels nor spirits. Less numerous than the Pharisees, they included the more wealthy and aristocratic, and at one time almost monopolized the more honored places in the priesthood and the highest dignities. There was a marked decrease in their number in the 1st century, but a revival of their views took place later, and their position is now represented by the Karaites. Most of the information regarding the Sadducees is drawn from Josephus and the New Testament.

SADI (sä'dee), the name assumed by Sheikh Muslih Addin, a celebrated didactic poet of Persia, born at Shiraz about 1184; died there in 1263. He descended from Ali, son-in-law of Mohammed, but little is known of his early history. After studying science and theology at Bagdad, he made a pilgrimage to Mecca, and soon after traveled extensively in Palestine, Syria, Hindustan, Egypt, and eastern Europe. The Crusaders made him a prisoner and required him to work as a slave on the Tripolitan fortifications, but he was recognized by an Aleppo merchant, who ransomed him. Fully fifty years of his life were spent in traveling, in the course of which he made fourteen pilgrimages to Mecca, but in the later part of his life he settled in his native town. Sadi not only delighted the people of his time by his writings in prose and verse, but with numerous sage precepts, which he was able to give in many different languages. His "Gulistan," or "Garden of Flowers," is counted his best writing, being a work in prose and verse that comprises anecdotes, stories, and numerous observations and reflections on morality. "Bostan," or "Tree Garden," is a collection of fables and histories; and "Pend-Nameh," or "Book of Instructions," is an elegant treatise on the duty of culture. It contains many maxims.

SADOWA (sä-dō'wä), a village in Bohemia, on the Bistritz River, near Königgratz. It is important as the scene of a decisive battle on July 3, 1866, in the Austro-Prussian War. The Austrian army of 220,000 was commanded by General Benedek, and the Prussian of 240,000 by King William I. The terrific battle raged from 8 A. M. to 4 P. M., resulting in the defeat of the Austrians with a loss of 21,000 men and 22,000 prisoners, while the Prussians lost only 9,000. This battle is sometimes called Königgratz, since the village of Sadowa is about eight miles distant.

SAFE, an iron or iron and steel receptacle for protecting valuables against burglars and fire. Documents and possessions of value were protected in ancient times by placing them in iron-bound oaken chests and in the charter-rooms of old mansions, but these have given way to fire and burglar-proof safes of modern construction. The first patent on a fire-proof safe was issued in 1801, and since then safes of all sizes and many different kinds have been made, which have gone into almost universal use among business men and others in civilized countries. Safes are commonly made with double-plated sides, the space between being filled with a non-conductor of heat, such as fire-clay and chalk, or plaster of Paris and alum. Some manufacturers pack a number of small tubes filled with an alkaline solution in the space between the two parts, these being hermetically sealed, and in case the safe becomes overheated the tubes burst and aid in saving the contents by saturating them.



SAFE.

To be of service for all purposes a safe must be heavy enough to be proof against being carried away, while its lock and the material used in its construction must contain the elements necessary to prevent burglars from forcing an entrance to secure the contents. The most secure safes have keyless time locks, which are so constructed that the owner may set a mechanical contrivance in the form of a clock, thereby making it

impossible to open the safe at any other time than that intended by the person setting the time clock. Electrical arrangements are provided in some cases to give signals in case there is an unlawful interference, and these are attached to the safes in such a manner that they may not be easily seen by intruders. Experience has demonstrated that it is much easier to render a safe fire-proof than to make it proof against burglars. Safes are made of any size to meet the needs of those wanting small or large accommodations in the way of space to receive deposits.

Safe-deposit companies are corporations that receive and keep money, stocks, jewelry, bullion, and other valuable property for depositors. This is an American enterprise, the first company being chartered in New York in 1861, but now there are safe-deposit companies in all the large cities of the world. These companies provide strong, fire-proof vaults, which they construct of steel and iron plates welded together, and surround them with strong masonry, thus making them absolutely proof against thieves and fire. Tiers of safes and deposit boxes of all sizes are placed in the interior, making it possible to accommodate patrons with the size and kind of storeroom wanted. The vaults are guarded by armed watchmen both day and night, and a careful record is kept of each depositor. A person renting a safe or box is described minutely in a record book. He receives a private password, and is supplied with the only key or keys that fit the lock of the box or safe rented, each being supplied with a different lock. Safe-deposit companies have been the means of saving many thousand dollars' worth of valuable papers and property in cases of fire, and in supplying protection for the valuables of residents and travelers.

SAFETY LAMP, a device for giving light in mines. It is constructed so the flame does not cause an explosion in cases where fire-damp prevails. Marsh gas is often freed in many coal mines by cutting into seams, and when mixed with a quantity of air, it assumes a highly explosive form. Besides the danger incident to the explosion, there is further danger from choke-damp after the explosion has occurred, for the reason that an explosion always renders a large bulk of air unfit to support life. Sir Humphry Davy, in 1816, invented the first safety lamp, but it has been materially improved upon within recent years. The Davy lamp depends upon the principle that flame does not pass through fine net-work of wire or gauze and that light does. It is constructed of a cistern to hold the oil, and the wick, issuing from a tube at the top, is covered and fully surrounded by wire gauze. The wires are usually not over one-fiftieth of an inch in diameter, and the apertures must not exceed one-twenty-second of a square inch. When constructed on that plan, the air passes through the apertures, even when charged with fire-damp. An improvement on the Davy lamp consists of a glass cylinder placed inside the wire gauze, thereby guarding against air currents and insuring a more uniform light. There is a perceptible increase in the size of the flame when the lighted lamp comes in contact with the atmosphere mixed with fire-damp, and the miner is thereby warned that danger is at hand. Reasonable safety is insured as long as the lamp is in good condition, but it has been found that it is not an absolute protection against danger. The newer safety lamps are self-extinguishing when brought into an explosive mixture of air and fire-damp. However, the most secure yet devised are the miners' lamps using electricity.

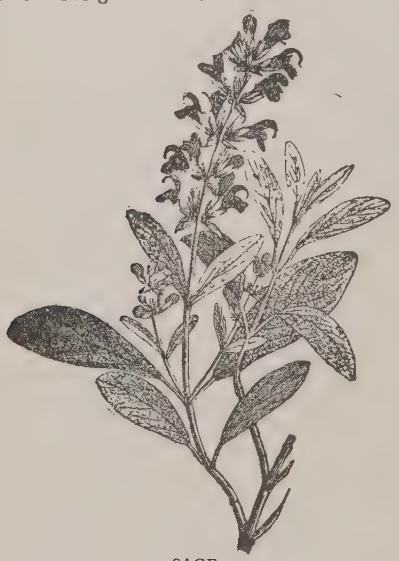
SAFFRON (săf'frŭn), an autumn-flowering species of crocus. It is often called autumnal crocus to distinguish it from a species called spring crocus, which it closely resembles. The flowers of the plant yield the saffron of the market, which is now used largely for coloring confectionery, liquors, medicine, and food-stuffs. It requires about 4,000 flowers to make an ounce of saffron. Formerly saffron was used as a dye material, for perfume, and as a medicine, but it has gone out of use for those purposes, except in parts of Asia. The saffron plant is cultivated extensively for its flowers in France, Spain, Italy, and western Asia.

SAFFRON.

SAGA (sā'gà), meaning a tale, the name used to designate a form of literature common to the ancient Scandinavians, particularly those of Iceland. The sagas include many volumes of writings that date from the 12th and the three following centuries. They embrace history, poetry, legends, and writings that blend fiction with authentic narratives. Prior to the 12th century they passed from generation to generation without being committed to writing; thus the mythical and fabulous circumstances connected with many of them are accounted for. The word has the same meaning as the German word sage, and German writers have applied the term to the legendry and traditional literature of their own and other countries. Thus the Firthjofs-Saga is attributed to the Norsemen, the Ingvars-Saga to the

Swedes, the Eymunds-Saga to the Russians, and the Knytlinga-Saga to the Danes.

SAGASTA (sä-gäs'tä), **Praxedes Mateo**, statesman, born at Torrecilla de Cameros, Spain, July 21, 1827. He was educated at the School of Engineers in Madrid, and in 1854 became a member of the constituent cortes, but took part in the insurrection of 1856 and was obliged to flee to France. A general amnesty proclaimed soon after permitted him to return to Spain, when he became professor of the School of Engineers in Madrid, and edited "La Iberia," the principal organ of the progressist party. In 1866 he took part in another insurrection and fled to France, and did not return till the death of Queen Isabella. He avowed his belief in a monarchial government for Spain in 1870, became minister of state the same year, and was successively minister of the interior, president of the council, and minister of foreign affairs. In 1827 he became



SAGE.

the leader of the liberal party. He caused the Castillo ministry to be overthrown in 1881, and was made prime minister in his stead. He was succeeded in the ministry by Jose Posado Herrera in 1883, but again became minister after the death of King Alfonso XII. In 1890 he retired, but was chosen minister in 1893, serving till 1895. The steady decline of Spanish influence in Cuba and the Philippines caused him to be called by the queen regent to form a new cabinet, serving as prime minister throughout the Spanish-American War. When the treaty of Paris, that required Spain to give up its principal colonies, was submitted to the cortes for ratification, Senor Sagasta and his cabinet supported its ratification, but a resignation followed on account of a majority of only two votes being polled against a counter measure. Sagasta was one of the leading statesmen in the recent history of Spain. He died Jan. 5, 1903.

SAGE, an extensive genus of plants of the mint family, which are widely distributed in warm regions, embracing 450 species. Most varieties are perennials of a shrubby nature. They have greenish-gray leaves, bluish flowers, and grow to a height of about two feet. The garden sage, native to southern Europe, is the best known. It is used extensively for flavoring meat, especially for dressing in poultry, and the leaves are employed in making a slightly stimulating tea. The apple-bearing sage is native to Crete, where the gall-nuts are used in flavoring confectionery.

SAGE, Russell, capitalist, born in Oneida county, New York, Aug. 4, 1816. After attending the public schools, he engaged in business at Troy, but later removed to New York City, where he acquired a fortune by investing in railroad stocks. He promoted various telegraph and cable companies, and was an investor in the elevated railroad of New York City. In 1853 he was elected to congress as a whig, and was reëlected in 1855. An attempt was made to assassinate him in 1891 by means of a dynamite bomb, but he escaped uninjured, while W. R. Laidlaw, one of his clerks, received severe injury. The latter sued him for damages in 1895, and was awarded $40,000.

SAGINAW (săg'ĭ-nạ), an important city of Michigan, in Saginaw county, ninety-five miles northwest of Detroit. It is situated on the Saginaw River, has extensive railroad facilities, and a good harbor. The largest vessels that ply on the lake are able to reach it. There are excellent county buildings, street railways, electric and gas lights, street pavements, public parks, and four libraries. The city has twenty-five school buildings, fifty churches, and is the seat of a number of scientific and educational associations. Among its manufactures are lumber products, flour, furniture, sailing vessels, salt, tobacco products, engines, and machinery. The manufacturing establishments represent a capital of $15,500,000, and employ 6,250 persons. Formerly there were two cities, known as Saginaw and East Saginaw, but they were united by an act of the legislature in 1890. A number of excellent bridges cross the Saginaw River, thus joining the cities for traffic and rapid transit. Saginaw has a large trade in salt, lumber, manufactures, and merchandise. Population, 1904, 46,610.

SAGINAW BAY, an inlet from Lake Huron into the state of Michigan, and forming the largest and most important bay of the southern peninsula. It is sixty miles long and thirty wide. Saginaw Bay has several fine harbors and valuable fisheries. It receives the water from the Saginaw River, a stream formed by the Shiawassee

and Flint rivers. The Saginaw River is thirty miles long, and is navigable for twenty-four miles by steamers drawing ten feet of water. Its principal tributaries are the Chippewa and Cass rivers.

SAGO (sā'gō), an article of food obtained from the inner portion of the bark of several species of palm trees. The sago-bearing palms thrive in the East and West Indies,

SAGO PALM AND FRUIT.

the Bahamas, and New Guinea. They attain a height of from twenty to thirty-five feet and a diameter of about twenty inches. The trees are cut down at maturity to secure the medullary or inner part, which weighs from 150 to 700 pounds. It is reduced to powder, and by a process of treatment, formed into grains about the size of coriander seeds, or is ground into a whitish powder called sago-meal. In the countries where sago is produced it is used extensively as a staple food. Elsewhere it is eaten mainly as a delicate article of diet. It is also employed as a starch for textile fabrics, in adulterating arrowroot, and as an essential ingredient for making soluble cocoas.

SAGUENAY (săg-ę-nā'), a river of Canada, in the province of Quebec. It is formed nine miles southeast of Lake St. John by two outlets of that lake. Its course toward the southeast is about one hundred miles long, flowing into the St. Lawrence at Tadousac harbor. There are remarkable cliffs and fine scenery in its lower course. It is navigable to Haha Bay for the largest steamers.

SAGUNTUM, or **Saguntus**, anciently an important city of Spain, near the Ebro, on the Canales River, three miles from the Mediterranean. The city was founded by Greek traders, under whose influence it rose to wealth and commercial importance, but is noted in history more particularly for the siege and battle fought there by the Carthaginians under Hannibal in 219 B. C. The siege extended over a period of about one year against an army of 150,000 men. After being sorely pressed by a famine, the city made a most heroic effort to repel the besieging army, but its army was utterly routed and the city was destroyed. This battle was the direct cause of the Second Punic War. The site of Saguntum is now occupied by the town of Murviedro. Near it are the remains of a theater and the ruins of a temple of Bacchus.

SAHARA (sȧ-hä'rȧ), the extensive desert of North Africa, embracing the largest unproductive region in the world. It may be said to extend east and west from the Atlantic to the Nile, and from the interior of the Soudan northward to the interior of Tripoli, Algeria, and Morocco, but there are deserts of more or less extent penetrating from it in various directions. The entire area included in the desert is estimated at 3,565,565 square miles, or a region nearly as large as all of Europe. Its surface is constituted of formations differing vastly in composition, and ranges in altitude from one hundred feet below to 8,000 feet above sea-level. It may be said to form a vast undulating expanse, being formed mainly of ranges of hills, dry water courses, evaporated lake-beds, extensive sand tracts, and here and there oases bearing a variety of vegetable forms. In the northern part are ranges of mountains extending southward from the chains of the Atlas in Morocco and Algeria, where also are the tracts known as the Gidi and Areg deserts. The most extensive tracts of level surface are in the interior and southern parts, where the sand often drifts very much like snow in a storm, with the difference that it is much more unpleasant and sometimes extremely dangerous. A large part of Egypt and Abyssinia are included in the Libyan desert, which extends westward beyond 20° E. of Greenwich.

It was formerly supposed that the Sahara lies almost exclusively below the level of the sea, and that interior Africa could be redeemed for cultivation by conducting the water from the ocean through a vast canal to supply a water surface sufficient for the formation of clouds that would distribute rain in abundance. This view has been disposed of by recent explorations, but it is reasonably certain that low-lying districts between Morocco and the Senegal River, now belonging to Spain, could be redeemed by admitting water from the Atlantic. Many species of wild animals are abundant in the Sahara, among them the hyena, antelope, mountain sheep, baboon, tortoise, ostrich, lion, and many others, all of which find an abundance of material for subsistence in the oases or on the desert tracts producing at least scant supplies of vegetation. Serpents, jerboas, lizards, and allied forms of life are quite common in the regions of burning sands, where a variety of herbage prevails that subsists with little moisture. In the regions of great heat and moving sands, as the Gidi Desert, extending through the

expanse south of Morocco nearly parallel to the Atlas Mountains, the most characteristic features of the desert are found, such as total absence of water and vegetation, and the presence of intense heat and wind.

The Sahara Desert is crossed and traversed exclusively by caravans, though railroads have been built across short expanses projecting from the desert proper, particularly in the Nile basin and Algeria, and the French have projected a line to run through the regions tributary to the Upper Senegal and Niger rivers. There is a particular advantage in traveling from oasis to oasis in caravans, because an organized company can better supply itself with the necessary means of subsistence, such as water and food, for long journeys. Besides, these organized companies have greater assurance of overcoming the danger attending the hot winds, or simooms, and attacks by hostile natives. Many of the oases are well watered and by reason of great fertility support a considerable trade, and, in many cases, one or more towns. The moisture common to oases comes largely from springs and subterranean water courses, but in southern Algeria and elsewhere the productive area has been greatly enlarged by artesian wells, the depth ranging from ten to 400 feet.

It is estimated that the Sahara has a population of about 2,500,000, which is made up largely of Berbers, Arabs, and Negroes. The inhabitants subsist mainly by the cultivation of cereals and fruits and the rearing of camels and sheep. In some regions they conduct a considerable trade with the caravans that move periodically through the different sections. The most important caravan routes extend from the northern part of the Soudan to the Nile and the seaports of the Mediterranean. In many parts of the Sahara valuable mineral deposits are abundant, especially salt, which is derived largely from the vicinity of Lake Kaffra. Deposits of granite, iron, limestone, and many of the metals are also abundant, but these are practically undeveloped. Salt is produced quite extensively, and is transported to ports on the Mediterranean, or conveyed by caravans and the Niger River to the Atlantic ports.

SAIGON (sä'ē-gŏn), or **Saigun**, the capital of French Cochin China, on the Saigon River, near where the stream enters the South China Sea. It is one of the most important riverports of southern Asia. Saigon has convenient railroad facilities and canal connections with the Mekong. It has a large interior trade in cereals and fruits, and a vast commerce with China and the East Indies, principally in rice. Among the manufactures are earthenware, sailing vessels, clothing, lumber products, tobacco and cigars, textiles, and machinery. It is strongly fortified, and contains a number of important government buildings, hospitals, temples, and educational institutions. Since 1862 it has belonged to France. Population, 65,250.

SAIL, a class of canvas cloth used to attach to a mast or stay on a vessel. Its purpose is to aid in propelling or moving the vessel in the water. Various kinds of material are employed in making sailcloth, but flax and hemp are used most generally. Cotton, jute, linen, and various vegetable fibers are utilized in making certain kinds of sails. Several breadths of canvas are necessary to construct a single sail. They are securely sewed together by a double seam, and a bolt-rope is fastened around the edge by means of a strong cord. The size of the sail depends upon the vessel, since the larger forms require a greater propelling force to move them in the water, hence the size and strength of the sail is proportional to the size of the ship or boat on which it is to be used. It is possible to secure the greatest propelling power when the wind is right astern, but advantage may be gained when it is on either beam by dividing the sail into two parts; the one part acting to cause the vessel to move sideways, and the other having a tendency to propel it forward. Various other combinations are taken advantage of in placing the sails which make it possible to gain a forward movement with a fairly unfavorable wind, though under such conditions it becomes necessary to have the vessel move in a zigzag course.

The two principal types are square sails and fore-and-aft sails. Square sails are four-sided. They are bent to a yard and are normally at right angles to the keel. Fore-and-aft sails are attached to a boom, gaff, or stay, and are normally nearly parallel to the keel. The upper edge of a sail is called the head; the lower edge, the foot; and the sides in most sails are known as leeches. The lower corners of a square sail are its clews, and the same name is applied to the lower after corner of a fore-and-aft sail. A tack is the lower forward corner of a fore-and-aft sail, or the lower weather corner of a square sail, and the earing is the upper corner of the latter kind. Sail-making was an important industry among the ancients, and still continues to hold an important place among the industries, although steam is now employed largely in navigation.

ST. ALBANS (al'bạnz), county-seat of Franklin county, Vermont, twenty-five miles northeast of Burlington. It has good railroad facilities, modern county buildings, and an excellent public park. The surrounding country is fertile, producing cereals, fruits, and vegetables. There are numerous marble quarries within its vicinity. St. Albans is the seat of an academy, a hospital, a public library, two convents, and a home for children. It has an extensive trade in cheese, butter, and marble products. Population, 1900, 6,239.

ST. ALBANS, a city of England, in Hert-

fordshire, about twenty miles northwest of London. It has convenient railroad connections with London and other cities. Among the manufactures are silk and other textiles, earthenware, and machinery. It has a number of machine shops and iron foundries. St. Albans is noted particularly for the Benedictine Abbey founded there by King Offa of Mercia in 795, in which Cardinal Wolsey served as abbot. The city contains a monument to Lord Bacon, and the tomb of Sir John Mandeville, a famous traveler. Two battles were fought at St. Albans in the War of the Roses, in 1455 and 1461. Population, 13,230.

ST. ANDREWS, a town of Scotland, in Fife county, thirty-five miles northeast of Edinburgh. It is a seaport of the North Sea, has railroad facilities, and contains the celebrated University of St. Andrews. This institution was founded in 1411, and is the oldest university in Scotland. In connection with it are a museum, a botanical garden, and a library of 112,000 volumes. St. Andrews has a fine cathedral, numerous other churches, and a considerable trade. Population, 8,658.

ST. AUGUSTINE, (ą-gŭs-tēn'), county seat of St. Johns county, Florida, near the Atlantic coast, thirty-five miles southeast of Jacksonville. It has convenient railroad communications, and enjoys a considerable trade in merchandise. Among the manufactures are tobacco products, utensils, and machinery. It is the seat of good public schools, several colleges, an institution for the education of the deaf and dumb, a number of convents, and a Franciscan monastery. The city is the oldest in the United States. It was founded in 1565, when the Spaniards under Menendez established it as a center of influence and built a fort there. The streets are narrow in some parts of the city, but within recent years many improvements have been made, and it has become noted as a popular winter watering place. Many remains from the early period of its history have been preserved, including the Ponce de Leon and the Alcazar hotels; the former residence of the Spanish governor, now used for the post office, and the old fortress of San Marco, now called Fort Marion. The surrounding country is dotted with orchards of orange and lemon trees, and the climate is remarkably equable and healthful. Population, 1900, 4,272.

ST. BERNARD DOG. See **DOG**.

ST. BERNARD PASS (bẽr'nard), the name generally applied to two passes of the Alps. They are distinguished from each other by the names Great St. Bernard and Little St. Bernard. The former is on the east side of Mont Blanc, in the Pennine Alps, between the Canton of Valais, Switzerland, and the department of Piedmont, Italy. It is 8,125 feet high, and near its highest part is the famous hospice founded by St. Bernard de Menthon in 962, as a refuge of safety for those crossing the Alps. The pass is covered with snow nine months of the year, and the monks of the hospice keep a number of St. Bernard and Newfoundland dogs to aid in rescuing those in danger or distress from cold. Among the famous armies that traversed this pass were that of the Romans, that of Charlemagne, that of Frederick Barbarossa, and that of Napoleon when invading Italy in 1800. Little St. Bernard is south of Mont Blanc, crossing the Gracian Alps from the Isere valley, in France, to the Dona Baltea valley, in Italy. It is 7,175 feet high. Near its summit is a hospice, which was founded by St. Bernard de Menthon. It is comparatively easier to cross than the Great St. Bernard. Some writers assert that Hannibal led his army of invasion into Italy through the Little St. Bernard Pass, but others think he made the descent by the Great St. Bernard.

ST. CATHARINES (käth'ă-rĭnz), a city of Canada, in the province of Ontario, twelve miles northwest of Niagara Falls. It is on the Welland Canal, has excellent railroad facilities, and is noted for its marine hospital and artesian mineral wells. Its chief manufactures include cotton and woolen goods, farming implements, flour, and machinery. It is a port of entry and has a growing trade. Population, 9,946.

ST. CHARLES, a city in Missouri, county seat of St. Charles county, on the Missouri River, twenty-two miles northwest of St. Louis. A splendid railroad bridge 6,535 feet long crosses the river at St. Charles. It has excellent railroad facilities, several fine public schools, and excellent church buildings. It is the seat of St. Charles College, Lindenwood Female College, and the Convent of the Sacred Heart. Among the manufactures are flour, tobacco, cotton and woolen goods, dairy products, and earthenware. It was settled in 1769, and was the state capital from 1821 to 1826. Population, 1900, 7,982.

ST. CLAIR, a river and lake of North America, which form a part of the boundary between the state of Michigan and the Canadian province of Ontario. The St. Clair River flows from Lake Huron into Lake St. Clair. It is about forty miles long and half a mile wide, and is of vast importance in the navigation of the Great Lakes. A railroad tunnel under it extends from Port Huron, Michigan, to Sarnia, Ontario, and has a length of 11,550 feet. Lake St. Clair receives the water from the St. Clair and Thames rivers, and its surplusage flows through the Detroit River into Lake Erie. It is thirty miles long, about twenty-five miles wide, and has an area of 360 square miles. Within it are several islands and it has excellent fisheries. Its surface is 575 feet above sea-level.

ST. CLOUD, a city in Minnesota, county seat of Stearns county, sixty miles northwest of St. Paul, on the Mississippi River.

It has good railroad connections with other trade centers, and abundance of water power. A fine county courthouse, several public schools, and many fine churches are among its public buildings. It is the seat of a state normal school and the state reformatory. In its vicinity are productive deposits of granite. The manufactures include lumber products, flour, wagons, farming implements, and machinery. Population, 1900, 8,663.

ST. CLOUD, a town of France, on the Seine River, six miles west of Paris. It was long noted for the celebrated palace of St. Cloud, which was used as a summer residence by Napoleon I., Louis XVIII., Charles X., Louis Philippe, and Napoleon III. The palace was destroyed in the siege of Paris in 1870, but the park in which it stood is still one of the finest in the vicinity of Paris. The town has a population of 5,446.

ST. CROIX (kroi'), a river of North America, forming a part of the boundary between Maine and New Brunswick. It issues from Schoodic or Grand Lake, and after a course of seventy-five miles toward the southeast flows into Passamaquoddy Bay. Steamboats ascend to St. Stephen, a distance of twenty miles. It is sometimes called the Schoodic and the Passamaquoddy River.—St. Croix, a river of Wisconsin. It rises near the southwest part of Lake Superior, has a southerly course, and flows into the Mississippi thirty-five miles below St. Paul. Its length is about 200 miles.

ST. CYR (son seer'), a town in France, two miles west of Versailles, with which it is connected by railway. Louis XIV. founded a school for girls at St. Cyr, at which Racine's "Ester" and "Athalia" were written expressly for the pupils. The school was suppressed by the Revolution, but Napoleon founded the famous military school at St. Cyr on its site in 1806, and near it are two of the advance forts of the new enceinte around Paris. Population, 3,765.

ST. DENIS (săn dnē'), an important manufacturing center of France, four miles north of Paris, with which it is connected by railway and rapid transit. It is strongly fortified, has canal connections with the inner harbor of Paris, and contains numerous buildings of historic interest. The famous Abbey of St. Denis was completed under Philip the Bold, and was long the burying place of French kings. Louis XII. caused mausoleums to be built with figures of the princes buried there, and monuments were added by all the monarchs up to Henry II. Napoleon founded a school for daughters of the members of the Legion of Honor in the monastery, which still flourishes, and Louis XVIII. improved the museums and added numerous monuments. St. Denis is at present one of the most beautiful and scenic cities of France. It has many fine buildings and gardens. Its principal manufactures embrace leather, flour, sailing vessels, railway cars, engines, chemicals, textile fabrics, and machinery. The city was so named from the abbey founded by Dagobert on the burial place of St. Denis, the apostle of Paris. Population, 51,755.

SAINTE-BEUVE (sănt-bûv'), **Charles Augustin**, eminent literary critic, born at Bologne-sur-Mer, France, in 1804; died Oct. 13, 1869. He was born shortly after the death of his father, and his early education devolved upon his mother, who gave him the best training possible under adverse circumstances. He entered the College Charlemagne at Paris in 1818, and after studying medicine for some years, took up a literary course. In 1840 he became keeper of the Mazarin library, a position that made it possible for him to devote himself studiously to literary criticism and to writing contributions for the "Constitutionel." His most important writings include a review of Victor Hugo's "Odes and Ballads," and the twenty-eight volumes embraced in his "Monday Talks." The latter comprises the contributions published in the "Constitutionel" on Mondays.

St. ELIAS, Mount, an elevated mountain of North America, situated near the boundary between Alaska and British America, and elevated 18,100 feet above sea-level. It was long thought that St. Elias is the highest mountain peak of North America, but Mount McKinley is now so regarded, its peak towering 20,464 feet above sea-level. Great glaciers move from its perpetually snow-covered sides, and have worn great precipices and chasms in their course to the Pacific. It is an important landmark, for the reason that it is completely isolated from other great peaks.

ST. ETIENNE (sănt ā-tē-enn'), an important city of France, in the department of Loire, of which it is the capital. It is situated on the Furens, a tributary of the Loire, about thirty miles southwest of Lyons. The city has railroad connections with other trade emporiums, and its streets are well improved with electric lights, pavements, waterworks, and rapid transit. The churches of St. Etienne and Notre Dame are noted structures. It is the seat of a school of fine arts, several industrial schools, a museum, and a well-organized public school system. Its importance as a manufacturing center is due to the water power drawn from the Furens River. Among the products are firearms, cutlery, Bessemer steel, engines, railway cars, earthenware, and machinery. Its ribbon trade is counted the largest in the world, and it gives employment to 45,000 weavers. It has a growing export trade in merchandise, coal, and clothing. Population, 135,690.

SAINT-EVREMOND (săn-tăvr-mōn'), **Seigneur de**, eminent author, born in St. Denis, France, April 1, 1613; died Sept. 29, 1703. He descended from a noble family of Normandy, and after studying under the Jesuits, entered the military service, taking

part in the battles of Freiburg, Rocroi, and Nordlingen. Later he engaged in literary work, but a witty essay on a treaty made between Normandy and England required him to seek safety in flight to Holland and later to England, spending the latter years of his life in London. He was a personal friend of Charles II. and other distinguished men of England. Many of his essays, comedies, and letters are counted among the masterpieces of the latter part of the 17th century, all showing much wit and elegant style. An edition of his collected works was published in 1804.

ST. FRANCIS (sānt frăn'sĭs), the name of two rivers in North America, one in the United States and the other in Canada. The former rises in southeastern Missouri, has a general course of 450 miles toward the south, and flows into the Mississippi near Helena, Arkansas. It forms a part of the boundary between Missouri and Arkansas, and is navigable for 150 miles. In several places it expands into long lakes, thought to be due to sinking of the soil as a result of the earthquake in 1811. The St. Francis River of Canada is one of the important tributaries of the St. Lawrence. It rises in St. Francis Lake, in southeastern Quebec, and after a course of 120 miles enters the St. Lawrence near Lake St. Peter.

ST. GALL (săn gäl'), a city of Switzerland, capital of a canton of the same name, six miles southwest of Lake Constance. It is connected with other cities of Europe by a railway line, and has a considerable trade. Among the manufactures are textile fabrics, chemicals, clothing, and machinery. It was so named from a convent founded there in the seventh century. Its German name is St. Gallen. The city has electric lights, telephones, and street pavements. It is surrounded by a fertile and scenic country. Population, 28,912.

SAINT GAUDENS (sānt gaw'dẹnz), **Augustus**, American sculptor, born in Dublin, Ireland, March 1, 1848. He was brought to New York City at the age of six months. After attending the public schools, he took instruction in drawing at the Cooper Institute, and in 1867 went to Europe, where he studied art in Paris and Rome. His first work of note is "Hiawatha," which he completed in 1871 while at Rome. He returned to New York in 1872, and in 1893 served as a juror of acceptance in the sculpture department of the Columbian Exposition. Among his principal works are his statues of Abraham Lincoln, in Chicago; Admiral Farragut, in New York; and Robert E. Randall, at Sailors' Snug Harbor, New York. He made a fine statue entitled "Diana," and portrait busts of Theodore D. Woolsey, William M. Evarts, and William T. Sherman.

ST. GERMAIN (săn zhĕr-măn'), a town of France, on the Seine River, seven miles west of Paris. It is famous for the Royal Castle that served as a residence for the kings of France till Louis XIV., who moved the court to Versailles. There are excellent monuments, among them one erected by George IV. over the remains of James II. of England, who was an exile in the town. It is the seat of a number of monasteries and several convents. A terrace was built along the river front in 1672, and near the town is a splendidly preserved forest of 10,000 acres. The city has railroad advantages and manufactures of various kinds. Near it are fine orchards. Population, 17,637.

ST. GOTHARD (săn gō-tär'). See **Gothard, St.**

ST. HELENA (sĕnt hẹ-lē'nạ), an island in the South Atlantic Ocean, 1,200 miles west of Portuguese West Africa. It has precipitous shores and a mountainous surface. Its area is forty-seven square miles. The island is of volcanic origin, forming the summit of a former volcano of a submerged region. Diana's Peak is the highest elevation; height, 2,700 feet. A small portion of the surface is susceptible to cultivation, and is utilized in the culture of vegetables and fruits. Whale and other fisheries comprise the principal industry. It had a considerable commerce before the Suez Canal was opened to traffic, but at present the trade is principally in fish, which are exported. The imports are articles of food and clothing. St. Helena was discovered by the Portuguese in 1502, but it became a British possession in 1651. The island is noted as the place at which Napoleon was exiled after his final defeat at Waterloo, in 1815, and he died there in 1821. He made his home with a farmer named Longwood, and his remains were buried there, but the body was removed to France in 1840, and the Longwood farm was purchased by the French government in 1858. Gen. Piet Cronje was held there in exile by the British for some time after his capture in the Boer War of 1899-1901. Jamestown is the seat of local government. Population of the island, 6,440.

ST. HELENS (sĕnt hĕl'ẹnz), a city of England, in Lancashire, ten miles northeast of Liverpool. It is important as a trade and manufacturing center, and in its vicinity are extensive deposits of coal. Electric lights, street pavements, waterworks, and street railways are among the improvements. The manufactures embrace glass, chemicals, iron, copper, and lead. It has many fine school and church buildings. Population, 72,150.

ST. JOHN (sānt jŏn'), a river of North America, which rises in eastern Maine. After flowing northeast for some distance, it makes a bold curve and flows toward the southeast, entering the Bay of Fundy. Its course is irregular, and it has a large number of tributaries, among them the Alleguash, Big Machais, and Tobique rivers. Its entire course is 450 miles, of which 150 miles are navigable. The St. John forms a part

of the boundary between Maine and New Brunswick. At its mouth is the city of St. John, New Brunswick, and about 225 miles up the river are the Grand Falls, seventy-five feet high.

ST. JOHN, a seaport city of Canada, in the province of New Brunswick, on the Bay of Fundy and the St. John River. It has ample railroad facilities, an excellent harbor, and is the most important commercial city of the province. The city has an extensive trade in lumber, fish, merchandise, and manufactures. Among the principal industries are ship-building, fisheries, and the manufacture of clothing, lumber products, and machinery. The noteworthy buildings include an excellent Roman Catholic cathedral and numerous other churches. It is the seat of a Baptist seminary, Masonic and Odd Fellows' halls, Wiggin's Orphan Asylum, excellent public school buildings, and numerous scientific, charitable, and religious associations. The city is supplied with an extensive system of rapid transit, has gas and electric lights, several libraries, and other municipal facilities. It has a growing interior and foreign trade. Population, 40,711.

ST. JOHN OF JERUSALEM, Knights of, an association of a military and religious character founded at Jerusalem in the Middle Ages. The merchants of Amalfi obtained permission, in 1023, from the caliph of Egypt to found an institution in Jerusalem for the care of poor and sick pilgrims. Its fame spread throughout Europe by grateful travelers, who recommended it to those wishing to see the Holy City, and many sent contributions to improve and enlarge its capacity. Its rapid growth led to the founding of the Order of St. John, and when Jerusalem was taken by the Crusaders under Godfrey de Bouillon, his soldiers were attended in the Amalfi Hospital of St. John under the direction of its rector, Peter Gerard. A regularly constituted religious body was formed under the rector, which received the approval of Pope Paschal II. in 1113, and soon after commanderies were established in many Mediterranean towns to protect pilgrims as they passed to and from Jerusalem, and these in time became known as Hospitallers.

The order gradually grew in military and aristocratic power for a century, and in 1289 an Egyptian force was sent to besiege Acre, which was the only remaining Christian seat of influence at that time, but it fell soon after. The knights sailed to Cyprus in 1291, and vainly tried to reëstablish a foothold in Palestine, but they were finally compelled to abandon the project and instead undertook the conquest of Rhodes, which was taken in 1310 along with a number of other islands. There they not only established themselves, but greatly improved the islands, constructing edifices, places of worship, and hospitals, and developed the culture of vegetables, cereals, and fruits. For more than 200 years they maintained themselves against repeated attacks of the Turks, but the fall of Constantinople gave the Turks material advantage, and Sultan Solyman finally captured Rhodes in 1523.

The homeless knights were provided for by Emperor Charles V., of Germany, ceding to them the islands of Malta and Gozo, and the fortress of Tripoli in Africa, but they never regained their former importance. However, the powerful fortress of Malta became the bulwark of Christendom, and its name was assumed by the order. In 1551 the Turks conducted a fruitless attack on the island, and made a second attack in 1565. The defense under the grand master, Jean Parsiot de la Valette (1494-1568), forced the besiegers to retire. However, they were weakened by divisions that had existed for several centuries, and the crushing blow came in 1792, when the directory of France decreed that the order should be abolished because it had become an asylum for French refugees. Malta was forcibly seized by the French in 1798, and since the order has been divided by factions. Several branches are still in existence in Europe, among them the German and Italian leagues and the Johanniter. The Hospitallers adopted a Maltese cross as their badge. They wore a red coat, and had as their motto "pro fide," to which they added "pro utilitate hominum," meaning "For the faith and for the service of men."

ST. JOHNS, the capital of Newfoundland, on the eastern shore of the island, sixty miles north of Cape Race. It has an excellent harbor on Freshwater Bay, is supplied with railroad conveniences, and has modern municipal facilities. The improvements include electric lights, waterworks, pavements, and sewerage. Among its manufactures are boots and shoes, nails, tobacco, leather, soap, cordage, seines, furniture, and machinery. The export trade in fish and seal-oil is extensive, and it has a considerable trade in lumber, merchandise, and supplies used in the fisheries. The government building is the most important in the city. It is the seat of a Roman Catholic cathedral, numerous other churches, a library, museum, and several fine public schools. Population, 33,230.

ST. JOHNS, a city of Porto Rico. See San Juan.

ST. JOHNS, a river of Florida, which rises in Brevard county, and after a course of 350 miles toward the north flows into the Atlantic Ocean, fifteen miles northeast of Jacksonville. It courses through a level region containing many orchards and groves, and is fed by springs and the overflow of swamps. For a distance of 200 miles of its lower course it is about a mile in width, and it is navigable for the largest steamers to Enterprise. It abounds in fish, and near it are extensive forests.

ST. JOSEPH, an important city in Mis-

(Opp. 1646)

TRANSPORTATION BUILDING AT THE LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO., IN 1904.

This building is 525 by 1,300 feet, and covers about fifteen acres. It contains four miles of standard gauge railroad track and affords an exhibit space of 270 000 square feet.

souri, county seat of Buchanan county, on the Missouri River, 108 miles above Kansas City. It is important as a railroad center, having ten different lines, and the river is crossed by a massive wagon and railroad bridge. Its manufactories give employment to 6,500 persons, and represent all the principal lines. The most important include boots and shoes, railway cars, furniture, farming implements, shirts, clothing, starch, spirituous liquors, engines, and machinery. It has an extensive trade in cereals, live-stock, merchandise, and fruit, its wholesale trade taking third rank in the state. Among the noteworthy buildings are the city hall, the county courthouse, a United States government building, a Roman Catholic cathedral, many other churches, and numerous excellent public school buildings. The city is the seat of a state insane asylum, and numerous institutions of higher learning. It was founded by a Frenchman named Joseph Robidoux in 1843, and became the county seat in 1846. After the discovery of gold in California, it ranked as an important emigrant station. The city has had a remarkable growth for the last two decades and has been greatly improved by modern facilities, among them electric lights and street railways, pavements, waterworks, sewerage, and public parks. It has numerous libraries and scientific and educational associations. It ranks as the thirty-fourth city of the United States. Population, 1900, 102,979.

SAINT-JUST (săn-zhüst'), **Antoine Louis de**, eminent Revolutionary leader, born at Decize, France, Aug. 25, 1767; guillotined July 28, 1794. He first studied at Soissons, but later took a law course at Rheims, where he became imbued with republican ideas and entered the electoral assembly immediately on attaining his majority. A strong friendship sprang up between him and Robespierre, and the two became intimately connected in the great events associated with the Revolution. He was made president of the convention in 1793, and at the sitting on the ninth Thermidor, the name of the eleventh month in the calendar of the first French Republic, he made a report that expressed his own views against the king and in favor of a republic. Before concluding his report, he was violently interrupted, and both he and Robespierre were arrested immediately after the sitting. The two perished on the same day along with twenty others, nearly all young men, Robespierre being thirty-six and Saint Just twenty-six years old. His chief writing is an essay entitled "The Spirit of the Revolution."

ST. LAWRENCE (sānt la'rens), a river of North America, the outlet of the Great Lakes into the Atlantic Ocean through the Gulf of St. Lawrence. It may be said that it includes as its basin all the vast region tributary to the Great Lakes, which embraces 510,000 square miles; 187,440 square miles being in the United States and 322,560 in Canada. When viewed from this aspect, its source is in the St. Louis, a river that rises in northern Minnesota and flows into Lake Superior near the city of Superior, Wisconsin. It is known as St. Mary's River or the Narrows between Lakes Superior and Huron; as St. Clair River between Lakes Huron and St. Clair; as Detroit River between Lakes St. Clair and Erie; as Niagara River between Lakes Erie and Ontario; and from Lake Ontario to the Gulf of St. Lawrence it is called the St. Lawrence. From the source of the St. Louis to the mouth of the St. Lawrence the distance is 2,150 miles, and from Lake Ontario to the Gulf of St. Lawrence, 750 miles. Atlantic steamers formerly ascended the St. Lawrence only to Montreal, a distance of 600 miles, but now they may navigate the entire lake and river system. Canals are utilized to pass the rapids between Montreal and Lake Ontario; Niagara Falls is passed by the Welland Canal, and Lake Superior is reached through the St. Mary's Canal, which passes around the Sault Ste. Marie rapids. The principal tributaries of the St. Lawrence proper are the Richelieu, Saguenay, Ottawa, St. Maurice, and Baptiscan rivers. At its entrance into the Gulf of St. Lawrence it forms a broad inlet about one hundred miles wide, and its general width to Lake Ontario is from one to four miles. Navigation is entirely obstructed by ice during the winter months. The St. Lawrence forms a part of the boundary between New York and Canada.

ST. LAWRENCE, Gulf of, an inlet from the Atlantic Ocean, on the northeastern shore of North America. It is partly enclosed by Newfoundland, Nova Scotia, New Brunswick, and Quebec. The Gulf of St. Lawrence forms a large continuation of the estuary of the St. Lawrence River, and communicates with the open sea by a channel between Nova Scotia and Newfoundland, which has a width of sixty-five miles. It is also joined to the Atlantic by the Strait of Belle Isle, lying between Labrador and Newfoundland, by the Gut of Canso, between Nova Scotia and Cape Breton. It has excellent fisheries. The principal islands in the gulf are Prince Edward, Anticosti, St. Paul's, and Magdalen.

ST. LOUIS (sānt lōō'is), an important city of the United States, the largest business emporium in the Mississippi valley. It is situated in the state of Missouri, on the Mississippi River, twenty miles below its confluence with the Missouri. The city is finely located on the west bank of the river, and opposite it is East St. Louis, Illinois. It has 400 miles of improved streets and about 350 miles of public and district sewers, and it is supplied with an extensive system of electric street railways. Its position as a railroad center gives it vast trade and manufacturing advantages, being entered by nearly all the great trunk lines of the Missis-

sippi valley, and its location is further favored by the vast river commerce of the Mississippi system. The streets are lighted by gas and electricity. They have substantial pavements, and there are splendid park improvements, the latter including an area of 3,500 acres. Several substantial steel bridges cross the Mississippi, among them the Merchants' Bridge, completed in 1890, which is 2,450 feet long. Its water supply is drawn from the Mississippi by a vast system, having a capacity of 100,000,000 gallons daily. The water system has mains about 400 miles long, and in connection with it is one of the highest water towers in the world.

St. Louis is substantially built, and has many noteworthy and costly buildings. The Union Railroad Station is one of the finest railway depots of the world, having a train-shed covering over thirty tracks, and costing $6,500,000. Other massive structures include the city hall, the county courthouse, the Southern and Planters' Hotel, the Mer-

ST. LOUIS UNIVERSITY.

chants' Exchange, the United States government building, the Crow Museum building, the Mercantile Library, the Episcopal Christ's Church, Roman Catholic cathedral, and numerous other churches. Besides its excellent public school buildings, there are numerous institutions of higher learning. These include the Lutheran Concordia Theological Seminary, St. Louis University, Washington University, Christian Brothers' College, Beaumont Hospital Medical College, St. Louis Law School, St. Louis Training School for Nurses, St. Louis School of Pharmacy, St. Louis School of Fine Arts, and a number of charitable, educational, and scientific institutions. The aggregate number of volumes in its libraries is 350,000, the most noteworthy being the Free Public Library with 90,000, the Mercantile Library with 80,000, and the St. Louis University Library with 35,000. It has representative organizations of all leading civic and educational associations, making the city an important center of learning and art. St. Louis has fifteen daily, sixty-two weekly, and numerous monthly and quarterly periodicals.

In the city are 6,750 different manufacturing establishments, representing a capital of $150,500,000, and giving employment to 110,225 persons. The annual output of its manufactories represents a value of about $250,500,000. Among the most important manufactures are tobacco products, spirituous liquors, flour, packed meat, clothing, hardware, machinery, railway and street cars, boots and shoes, carriages, white lead, oils and paints, gas and water pipe, firebrick, furniture, saddlery, sugar, glass, and lumber products. Its splendid transportation facilities render the city an important distributing point for live-stock, merchandise, cereals, and manufactures. The packing houses handle annually vast numbers of hogs and cattle, while its grain elevators take high rank and receive vast quantities of cereals from regions far west, north, and south for cleaning, storage, manufacture, and distribution. A destructive cyclone visited the city in 1896, destroying property valued at about $25,000,000, but the damaged parts were rapidly rebuilt by the construction of newer and more valuable buildings. Forest Park, in the west part of the city, the seat of the Louisiana Purchase Exposition in 1904, is one of its many fine public places.

The first permanent settlement on the site of St. Louis was made by Pierre Laclede Liguest, in 1764, who had conducted a company of French trading merchants to develop that region of the Louisiana Territory. However, the title became vested in Spain and the town was occupied by Spanish troops in 1771, but the territory of Louisiana was ceded back to France in 1800. In 1803 the United States purchased Louisiana from Napoleon, but St. Louis continued a trading point until its steady growth began in 1830. The Revolution of 1848 in Germany caused a large number of German immigrants to come to St. Louis, and from that time the city has enjoyed a remarkable growth in wealth and population. The German element was devotedly loyal to the Union in 1861, and under General Lyon captured Camp Jackson. A very large per cent. of the people are German or of German descent, which is evidenced by numerous well-organized musical societies maintained in the city. Its government is under a mayor and a city council, who are elected under the Australian ballot system. The conservative population of St. Louis, and its location of easy access from a vast producing region, insure the continuous growth of the city. It ranks as the fourth city of the United States, being exceeded in size only by New York, Chicago, and Philadelphia. The following table gives an exhibit of the population at various periods:

YEAR.	POPULATION.	YEAR.	POPULATION.
1799...	929	1856...	125,200
1810...	1,400	1866...	204,327
1820...	4,928	1870...	310,864
1830...	5,862	1880...	350,518
1840...	16,469	1890...	451,780
1850...	74,439	1900...	575,238

ST. LOUIS, a city of West Africa, capital of the French colony of Senegal, about one hundred miles northeast of Cape Verde. It is built on a small island near the mouth of the Senegal River, has a good harbor, and is strongly fortified. The streets are regularly platted, but some of them are in a state of neglect. The principal buildings include the government house, several public schools, a military hospital, and a number of churches. It has an extensive foreign and interior trade in gums, fruits, utensils, clothing, and general merchandise. Population, 21,362.

ST. MARY'S RIVER, the channel separating the upper peninsula of Michigan from Ontario, and connecting Lakes Superior and Huron. It is about sixty miles long, and contains a number of islands. The Sault Ste. Marie, or St. Mary's Falls, are a short distance below Lake Superior. They have rapids that fall twenty feet, and to permit the passage of vessels a canal has been cut through Michigan.

SAINT MAURICE (săn mō-rēs') a Canadian river, in the province of Quebec. It rises in Lake Manouin. At first it has an eastward, but later a southward course, and joins the St. Lawrence at Three Rivers. It flows through a heavily timbered country, and about twenty-two miles above its mouth are falls 160 feet high. Its entire length is 300 miles.

ST. PAUL, the capital of Minnesota, in Ramsey county, on the Mississippi River, immediately east of Minneapolis. It occupies a beautiful site, has extensive railroad connections with other trade emporiums, and is noted for its vast commercial and manufacturing trade. The streets are substantially paved with brick and granite. Excellently constructed asphalt paving has been provided in many residence portions. The city has a large number of public squares and parks; the largest of the latter is Como Park, including about 260 acres. The streets are lighted with gas and electric lights. They are traversed by an extensive street railway system, which furnishes connection with Minneapolis, and are amply supplied with sewerage and water facilities. Besides its excellent system of common and high schools, there are manual training and kindergartens, and a number of private and parochial schools. St. Paul has about 175 churches, including houses of worship for all leading denominations. The institutions of higher learning embrace Hamline University, St. Paul's Seminary, Lutheran Concordia College, St. Thomas's Seminary, and Macalester College. Among the many noteworthy buildings are the state capitol, the county courthouse, the union depot, Magdalen Hospital, an orphan asylum, and numerous charitable and state institutions. Its libraries include the public libraries of 35,000 volumes, the state library of 30,000 volumes, and the library of the Minnesota Historical Society of 25,000 volumes. The city as a whole is well built and healthful, and has long enjoyed prosperous growth.

St. Paul is at the head of navigation on the Mississippi, and this, together with its many important railroads, supplies material trade advantages. It has 1,850 different manufacturing establishments, which employ about 20,000 persons, and yield annually products valued at $40,500,000. The most voluminous business interests are centered in the slaughtering and meat packing establishments, and in its extensive grain trade. Among the manufactures are packed meats, machinery, lumber products, farming implements, earthenware, hardware, stoves, furniture, and machinery. Seven bridges cross the Mississippi River, and there is connection by telephone and rapid transit with Minneapolis. The banks of the Mississippi have been partly diked to insure against overflows in the region occupied by various railroad shops and manufactories.

The site of St. Paul was first settled in 1838 by a Canadian, who built a log cabin. In 1839 the first white child was born there, and the town site was located in 1847. It was made the territorial capital in 1851, and a railroad line was built from it to St. Anthony Falls, a distance of ten miles west, in 1862. Minneapolis and St. Paul have been rapidly building toward each other until now the space formerly lying between them forms a continuous city, and they are commonly spoken of as the Twin Cities. St. Paul ranks as the twenty-third city of the United States. It has enjoyed remarkable growth since 1880. In 1838 its population was only three; in 1860, 10,600; in 1880, 41,498; in 1890, 133,156; and in 1900, 163,065.

ST. PETERSBURG, the capital and largest city of Russia, at the head of the Gulf of Finland, where the gulf is entered by the Neva River. The Neva River divides into numerous mouths, thus forming a large number of islands, which are occupied by the city and connected by many bridges. Much of the city is built on flat ground, which was formerly marshy, and portions of it are still liable to overflow at times when the sea-level is raised by high winds blowing from the west. A systematic plan of continually building the city farther toward the sea by redeeming parts covered by water has been pursued for many years, thus adding to the extent of the city and improving its means of access by vessels. The streets are broad and regularly platted, intersecting each other at right angles. They have adequate lighting by gas and electricity, and are provided with an extensive net-work of rapid transit. A vast system of waterworks and sewerage is maintained, and there are substantial pavements and numerous public parks. The architecture is largely of pale-yellow stone, much of which is both artistic and substantial. It has vast national fortifications, both inland and toward the gulf.

St. Petersburg is sometimes called the city of palaces from the large number of edifices of that character. Among them is the famous Winter Palace, a residence of the emperor, with a capacity for accommodating 6,000 persons; the Hermitage Palace, containing a library of 125,000 volumes and 2,500 paintings by famous artists; and the Annitchkoff Palace of the czarevitch. Other important buildings include the Cathedral of St. Isaac, the churches of St. Peter and St. Paul, the government buildings, the stock exchange and numerous hospitals and national institutions. The Academy of Science, founded by Peter the Great in 1725, has a library of 160,000 volumes. Other institutions of higher learning include the Institute of Technology, the University of St. Petersburg, and a number of high schools, academies, and theological seminaries. The Imperial Library is noted as one of the most valuable in Europe, and has 1,200,000 volumes. The city is beautified by a number of excellent statues and monuments, among them the celebrated monument built in memory of Peter the Great. It has many benevolent institutions, scientific and educational associations, public parks, museums, botanical and zoölogical gardens, and theaters.

St. Petersburg has a vast interior and foreign trade. The former is facilitated by a large number of canals and railroads that center in thecity. It has a commodious harbor, extensive wharfage, and connection with all important foreign ports by numerous steamship lines. Formerly much of the foreign business was transacted at Cronstadt, a strongly fortified island town west of the city, but now a deep canal facilitates the entrance of the largest sea vessels to the well-improved harbor of the city. About 3,250 ships leave its port annually. The export and import business aggregates annually about $125,000,000. It is one of the most important manufacturing cities of Russia. The manufactures embrace leather, cotton and woolen goods, clothing, gobelin tapestry, spirituous liquors, glass, sugar, tobacco products, porcelain and glass, farming implements, hardware, clothing, and machinery. There is a large trade in corn, fish, rye, wheat, live-stock, lumber, and coal. Compared to other great cities of Europe, St. Petersburg may be said to rank as one of the newest. It was founded by Peter the Great in 1703, and stands on a site taken from the Swedes. It was made the capital of all the Russias in 1712, instead of Moscow. Under the successors of Peter it was extended rapidly and vast improvements and embellishments were made. Catharine II. made it of vast importance commercially by constructing a network of canals inland and draining large tracts of marshy lands surrounding the city. It is at present reckoned among the finest and wealthiest cities of the world. Population, 1,350,500.

SAINT-PIERRE (săn-pe-êr'), **Jacques Henri Bernardin de**, author, born in Havre, France, Jan. 19, 1737; died Jan. 21, 1814. He studied at Caen and Rouen, and soon after engaged as engineer in Malta. Later he was employed as engineer in Russia and Germany, and in 1766 went to Madagascar and Mauritius, serving the French government as engineer in the latter island for about three years. He returned to France in 1771 to publish accounts of his different voyages, and engaged in various other literary enterprises. His work entitled "Paul and Virginia" is a beautiful story founded on an incident witnessed in Mauritius. It has been translated into many different languages, including the Russian, German, English, Dutch, and the Romance languages. Another work of value from his pen is "Voyage to the Isle of France." Napoleon extended many distinguished honors to Saint-Pierre, enabling him to pass the closing years of his life at Eragny in comfortable circumstances.

ST. QUENTIN (săn kŏn-tăn'), a manufacturing city of France, on the Somme River, eighty miles northeast of Paris. It has extensive railroad facilities, and is on the St. Quentin Canal, which unites the Somme and Scheldt rivers. Among its noteworthy buildings is the Church of St. Quentin, the town hall, and numerous schools and hospitals. Among the manufactures are cotton and woolen goods, embroidery, billiard-balls, engines, hardware, and machinery. The surrounding country contains many manufacturing towns and is a productive fruit and dairying region. The Spanish captured St. Quentin in 1557. On Jan. 19, 1871, it surrendered to the German army, which was commanded by General von Goeben. The French army was under the command of General Faidherbe, the latter losing 10,000 prisoners and many dead and wounded. Population, 48,540.

SAINT-SIMON (sănt-sī'mon), **Claude Henri, Count of**, founder of French socialism, born in Paris, France, Oct. 17, 1760; died there May 19, 1825. He entered the army in 1778, and soon after joined other French nobles in assisting the American colonists in the Revolution. His inclination to take little part in the French Revolution caused him to be deprived of his property, but he afterward speculated in property secured as a part of the national domain by confiscation from the clergy and nobility, realizing a competence. In 1797 he entered upon a line of study to fit himself for reorganizing society, and traveled extensively in continental Europe to come in touch with and learn of the condition of the laboring and social classes. His time from 1803 till 1813 was devoted almost exclusively to the study and production of socialistic and political literature, many of his writings attracting wide attention. His "New Christianity" takes the form of a religion and embodies

the essential elements proposed by him for the reorganization of social life. He advanced the doctrine that social forces should be directed toward improving the moral and physical conditions of the most numerous and the poorest in society, basing the distribution of wealth on capacity and labor. The ambition with which he endeavored to establish socialism caused him to fall into poverty, and in 1812 a small pension was settled on him. However, his financial straits became so embarrassing that he attempted to commit suicide in 1823, which resulted in the loss of an eye. His socialistic doctrines are generally known as Saint-Simonism. "The Industrial Catechism" is one of his chief works.

SAINT-SIMON, Louis de Rouvroi, Duke of, soldier and author, born in Versailles, France, Jan. 16, 1675; died in Paris, March 2, 1755. He was a descendant from Charlemagne, and belonged to a different branch of the Saint-Simon family than the preceding. After studying under the care of his mother till 1693, he entered the military service, and gained the confidence of Louis XIV., whom he served as courtier. His tendency to personal independence and rigid morality made him unpopular among the aristocracy of the French court, but he served there with studious devotion, and became well informed in relation to the practices and proceedings of every phase of royal life. The later years of his life were spent in writing his celebrated "Memoirs," which were not published in a complete form until after his death, the first edition appearing in 1830. This work is of much historical value, for the reason that it contains useful information in regard to public life in the time of Louis XIV., especially regarding the practices intimately connected with court and official circles.

ST. THOMAS, the name of two islands, one off the west shore of Africa and the other in the West Indies. The island of St. Thomas off the west coast of Africa is in the Gulf of Guinea and is a Portuguese possession. It has an area of 355 square miles, produces coffee, sugar, cocoa, vanilla, and tropical fruits, and has a population of 18,620. The island of St. Thomas in the West Indies belongs to Denmark, and is situated thirty-five miles northeast of Porto Rico. It is thirteen miles long from east to west, has an area of twenty-three square miles, and a population of 15,790. Charlotte Amalia, on the south shore, is the capital. The island produces sugar, tobacco, and fruits.

ST. THOMAS, a city of Canada, capital of Elgin county, Ontario, sixteen miles south of London. It has railroad facilities, is surrounded by a productive country, and enjoys an extensive trade. The manufactures include leather, flour, farming implements, railroad cars, and machinery. It is the seat of several fine school and church buildings. Population, 11,485.

ST. VINCENT (sĕnt vĭn'sent), an island in the West Indies, belonging to the Windward group, one hundred miles west of Barbadoes. It has an area of 145 square miles. The soil is generally fertile and the surface undulating, but there is a volcanic range of mountains trending from north to south, which has caused disturbance at various times by volcanic action. The most active volcano is in the northwestern part, called Souffrière, whose extensive crater is about 3,000 feet above sea-level. Among the principal exports from the island are molasses, sugar, rum, spices, cocoa, and fruits. Columbus discovered St. Vincent in 1498, and it has been alternately neutral, French, and British, but since 1783 it has constituted a British possession. Kingston is the capital. The population of the island is 47,055.

ST. VINCENT, Cape, the southwestern extremity of Portugal, forming an extensive promontory in the Atlantic. Several important naval battles have been fought in its vicinity. In the first, on June 16, 1693, the English under Admiral Rooke were defeated by the French with the loss of twelve men-of-war and eighty merchantmen. Another battle of importance occurred there on Feb. 14, 1797, in which the English under Sir John Jervis defeated the combined fleet of Spain and France, and thus prevented a French invasion of England.

SAIS (să-ēs'), anciently a city of Egypt, on the Canoptic branch of the Nile delta. It is celebrated as the seat of many palaces and temples, and because it gave its name to the twenty-fourth and twenty-sixth dynasties of Egypt. Few ruins are left to indicate its former importance, but those remaining, considered in the light of history, make it certain that it contained a vast sepulcher of Osiris, within whose walls were the tombs of many kings. The twenty-sixth dynasty made it the capital of Egypt, but when the political center was removed to Memphis it began to decline. Solon and Pythagoras were among the Grecians to visit Sais. Plato was an instructor in its colleges, and there were close trade relations between it and Athens. Schiller made the legend of the mysterious veiled statue in the temple of Neith the subject of a ballad.

SAKI (sä'kē), a slightly intoxicating beverage manufactured in Japan, which forms the common stimulating drink of the Japanese. It is made from rice and is drunk warm, producing a speedy but transient intoxication.

SALA (sā'la), **George Augustus,** journalist and author, born in London, England, in 1828; died Dec. 8, 1895. He descended from an Italian family, and first studied to become an artist, but soon became interested in literature and journalism. At the time of the Civil War in the United States he corresponded to the "London Telegraph," a position which he also held during the Franco-German War in 1870-71, and later traveled

as a correspondent in Russia and Australia. In 1885 he made a visiting and lecturing tour of the United States, and in 1892 founded "Sala's Journal." His best known works include "London up to Date;" "My Dairy in America;" "In the Midst of the War;" "Seven Sons of Mammon;" "Paris Herself Again;" "From Waterloo to the Peninsula," and "Things I have Seen and People I have Known."

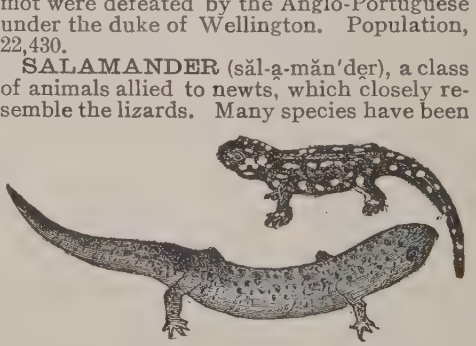
SALADIN (săl'a-dĭn), eminent sultan of Egypt and Syria, born at Tekrit, a town on the Tigris, in 1137; died in Damascus, March 4, 1193. His real name was Salah ed-Din, meaning holiness of the faith, but European writers have generally adopted the name Saladin. His father was the governor of Tekrit under the Seljuk Turks. He early entered the service of Noureddin, prince of Syria, accompanying various expeditions to Egypt under command of his uncle, who was a general in the army of the prince. He succeeded his uncle as grandvizier, and was soon after attacked at Alexandria by a Christian army, but he succeeded in escaping to Palestine, where he reduced several fortresses and defeated his assailants near Gaza. In 1174 he became sultan of Egypt and Syria, but not without a prolonged contest for succession. At length his title was confirmed by the caliph of Bagdad, which so strengthened his cause that he succeeded in annexing Mesopotamia and other regions of Asia, and in 1187 defeated a Christian army at Tiberias. On Oct. 2, 1187, he took Jerusalem, and soon after began the siege of Acre, but the Christian garrison obliged him to retreat.

The success of Saladin in conquering large parts of Syria aroused the Christians of Europe to enthusiasm, who organized the Third Crusade under the kings of France and England, but in the meantime Saladin became master of Acre. The Crusaders reached Acre in 1189 under King Richard of England and King Philip Augustus of France, and after a seige of two years, succeeded in capturing it. King Richard soon after defeated a detachment of Saladin's army at Ascalon in 1192, but disagreement among the soldiers prevented his army from reaching Jerusalem. However, a treaty was concluded by which the Syrian coast from Jaffa to Tyre fell into the hands of the Christians, and a truce for three years was agreed upon. Saladin soon after retired to Damascus, where he died the following year. He ranks in history among the most efficient and successful rulers of the Moslems. Besides giving encouragement to industries, he built canals, roads, and dikes. He founded cities, and planned to solidify the people under his dominion. He is the most eminent Moslem of the Third Crusade, and exemplifies Eastern chivalry to the highest extent. Sir Walter Scott treats the chivalrous side of Saladin in "The Talisman."

SALADO (sä-lä'dō), a river of South America, in Argentina. Its source is near the southern boundary of Bolivia, on the eastern slope of the Andes, and after flowing toward the southeast a distance of 750 miles, it joins the Parana at Santa Fe. The Salada flows through a fertile region, and is navigable about one-third of its course.

SALAMANCA (săl-a-măn'ka), a city of Spain, capital of the Salamanca province, on the Tormes River, 115 miles northwest of Madrid. Once renowned for its splendid edifices and institutions, it has declined under successive wars and a lack of industry, but within recent years the city has gained materially in population. A railroad line connects it with Valladolid and other places of importance. It has manufactures of clothing, leather, chemicals, and earthenware. Its picturesque scenery and magnificent remains of ancient buildings may be said to rank among the most noted of Spain. It is mentioned in history as having been taken by the Carthaginians under Hannibal in 222 B. C., but later the Romans captured it and made it the center of military influence in that part of Spain. Among its most noted buildings remaining is a cathedral in the Romanesque style dating from 1102, numerous other churches, several Jesuit colleges, and its great university. The university was in the height of its prosperity from the fifteenth to the seventeenth century, and at one time had 15,000 students, but at present there are not over 1,250. Its great square, designed for bullfights, was long an attraction for the sportive world, and has a capacity for 20,000 spectators. Salamanca was the scene of a battle on July 22, 1812, in which the French under Marshal Marmot were defeated by the Anglo-Portuguese under the duke of Wellington. Population, 22,430.

SALAMANDER (săl-a-măn'der), a class of animals allied to newts, which closely resemble the lizards. Many species have been



RED AND SPOTTED SALAMANDERS.

described. All have an elongated body, long tail, and four legs. The young are brought forth in water, where they at first breathe by gills, but later they take mostly to land and breathe by well developed lungs. Their food consists of snails, slugs, worms, and insects. The spotted salamander is a representative type. It has peculiar spots on its back and is a sluggish and stupid animal. It is common to the warm and temperate parts of Eurasia and Africa, where it attains

a length of about seven inches. The black salamander is somewhat smaller, and is peculiar for exuding a milky humor from the pores of the back and sides when alarmed, as a protection against small animals. Allied species are native to the temperate and warm parts of America, and they are spoken of as newts and efts. These animals were formerly thought to possess a body so cold as to be invulnerable to fire and other forms of heat, but this view has long since been dispersed, except among the illy informed of some parts of Eurasia.

SALAMIS (săl'ą-mĭs), **Battle of**, a celebrated naval engagement between the Greeks and Persians in 480 B. C. It occurred off the island of Salamis, near Athens, which is now generally called Koluri. This island forms a partial enclosure of the bay of Eleusis, has a generally rocky surface, and an area of thirty square miles. Koluri is the chief town; population 4,250. Anciently this island had several enterprising cities and a considerable production of fruits and manufactures. The battle of Salamis occurred shortly after the historic battle of Thermopylæ. Xerxes commanded the Persian fleet of 1,200 triremes and a large number of smaller vessels, and the combined fleet of the Grecians numbered only 365 triremes. There were two main divisions in the Grecian army, those of the Corinthians and the Athenians. The former were commanded by Adimantus and the latter by Themistocles, but the entire Grecian force was directed by the Spartan Eurybiades. Overconfidence of the Persians and the unwieldy number of their vessels made it possible for the Grecians to charge them with great success, and to protect their coast against further Persian attacks.

SALEM (sā'lĕm), a port city of Massachusetts, county seat of Essex county, on Massachusetts Bay, fifteen miles northeast of Boston. It has excellent railroad and steamboat facilities, and a large foreign trade with South American, Eurasian, and African countries. The harbor is comparatively shallow, but has been put in a condition of improvement that renders it quite safe and convenient. Salem has an excellent public school system, numerous churches, and several parochial schools. It is the seat of the Peabody Academy of Science, the Salem Athenæum, and the Essex Institute. It has fine county buildings, and is the seat of a state normal school. There are modern municipal facilities, among them gas and electric lights, rapid transit, public parks, and a public library of 30,000 volumes. The manufactures include boots and shoes, cotton and woolen goods, cordage, white lead, leather, earthenware, hardware, and machinery. Salem was founded in 1626, and the church erected by Roger Williams in 1634 may still be seen immediately back of Plummer Hall. The famous crusade against witchcraft occurred in 1692, which resulted in hanging nineteen persons on Gallows Hill, and the death of another by pressure. Salem is the birthplace of Nathaniel Hawthorne. It was incorporated as a city in 1836. Population, 1900, 35,956.

SALEM, a city of Ohio, in Columbiana county, seventy miles west of Pittsburg. It is surrounded by a fertile agricultural country, which contains deposits of bituminous coal. Its convenient railroad facilities make it the center of a considerable trade in live-stock, fruits, and merchandise. Among its manufactures are hardware, flour, pumps, and machinery. It is improved by electric lighting, waterworks, and pavements, and has fine school and church buildings. Population, 1900, 7,582.

SALEM, capital of Oregon, county seat of Marion county, on the Willamette River, fifty-two miles south of Portland. It has excellent railroad facilities, is surrounded by a fertile agricultural and dairying country, and enjoys a considerable trade in fruits and merchandise. The most noteworthy buildings are the state capitol, the county buildings, and numerous state institutions, among them a state prison, an insane asylum, and an institution for the blind, and deaf and dumb. It is the seat of the Willamette University, Friends' Institute, and excellent public and private schools. There are electric lights, public waterworks, pavements, and several libraries. Among its manufactures are linseed oil, leather, woolen goods, clothing, flour, furniture, tobacco, machinery, canned and dried fruits, and earthenware. The first settlement was made at Salem in 1834, and it became the state capital in 1860. Population, 1900, 4,406.

SALEM, a city of India, in the Madras presidency, about 125 miles southwest of Madras, with which it is connected by railways. It is the capital of a government of the same name. It has a number of noteworthy temples, government buildings, and educational institutions. Among the manufactures are carpets, clothing, hardware, earthenware, and machinery. Modern improvements, such as telephones, pavements, electric lights, and waterworks, have been constructed. The surrounding districts produce large quantities of rice, pulse, and fruits. Population, 68,315.

SALERNO (sä-lĕr'nō), a seaport city of southern Italy, on the Gulf of Salerno, thirty-two miles southeast of Naples, with which it is connected by a railroad. It is surrounded by a stone wall of Gothic structure, has an unimportant harbor, and few modern conveniences. The streets are mostly narrow and in a poor state of repair. It has a number of excellent buildings, among them a beautiful Gothic cathedral erected by the Normans, several baths, and a number of celebrated sepulchers. The famous University of Salerno was founded in 1150, but was abolished in 1817. Salerno

has improved materially since its railroad line was built, and has manufactures of silk and cotton textiles, earthenware, and utensils. The province of Salerno, of which the city of Salerno is the capital, is noted for its production of fruits and wine. Population of the city, 22,945.

SALFORD, a town in England. See Manchester.

SALIC LAW (săl'ĭk), the code of laws established by the Salian Franks. The name is applied particularly to one chapter of these laws, that in which succession to certain lands is limited to male heirs to the exclusion of females, chiefly because the possession of those lands implied certain military duties. The Salic Law was applied in France to the succession of the crown in the 14th century, thus excluding females from the throne.

SALINA (sa-lē'na), a city in Kansas, county seat of Saline county, on the Smoky River, thirty-eight miles east of Ellsworth. It is an important railroad junction, and in its vicinity are gypsum quarries and salt springs. The surrounding country is fertile, producing cereals, grasses, and fruits. It has an excellent public school system and numerous churches, and is the seat of the Kansas Wesleyan University and the Salina Normal University. The manufactures include flour, brooms, vehicles, ironware, and machinery. The city has electric lights and other municipal facilities. It has a growing trade in live-stock and cereals. Population, 1900, 6,074.

SALISBURY (salz'bẹr -ĭ), or **New Sarum**, a city of England, in Wiltshire, on the Avon River, eighty miles southwest of London. It has convenient railroad facilities, manufactures of cutlery and clothing, and several public schools. A splendid cathedral, completed in 1258, is its chief building. It is 473 feet long and 111 feet wide, and has a spire 400 feet high. Salisbury has a fine bishop's palace and the Blackmore Museum, the latter containing antiquities collected in America. Among the manufactures are cutlery and clothing. Population, 17,645.

SALISBURY, a city in North Carolina, county seat of Rowan county, about one hundred miles west of Raleigh. It is the focus of several railways and is surrounded by a fertile region, which produces cereals, tobacco, cotton, and fruits. A county courthouse, electric lights, telephones, and several fine schools are among the improvements. It is the seat of a state normal school and Livingstone College. Among the manufactures are cigars, flour, ironware, railroad cars, and machinery. Population, 1900, 6,277.

SALISBURY (sawlz'bẹr-ĭ), **Robert Arthur, Marquis of**, statesman, born in Hatfield, England, Feb. 3, 1830; died Aug. 22, 1903. He studied at Oxford University, where he completed a course by graduation. In 1853 he entered parliament for Stamford as a conservative, and in 1868 was created a marquis. He was known as Lord Robert Cecil in the house of commons till 1865, and then assumed the title of Viscount Cranborne. In 1866 he became secretary for India, a position he resigned in 1867, but was again appointed in 1874, and in 1878 he was made secretary of foreign affairs. In the same year he and the earl of Beaconsfield attended the congress of Berlin as representatives from Great Britain. His party sustained a defeat in the election of 1880, but he succeeded Lord Beaconsfield as leader of his party in the house of lords, and as such opposed Gladstone's Egyptian policy. When the government of Gladstone fell, in 1885, Salisbury succeeded him as premier, but resigned in the same year and was again elected in 1886. The conservatives were defeated in the general election of 1892, when he resigned, but with the success of that party in 1895 he again came into power. He was married to Georgina Alderson in 1857, a lady of considerable ability and influence, who died Nov. 20, 1899. Salisbury became chancellor of the University of Oxford in 1869, and has otherwise been accorded distinguished honors.

R. A. SALISBURY.

SALIVA (sa-lī'va), the thin, colorless liquid secreted in the mouth by the salivary glands, which serves to keep the mouth in a moist condition and aids mastication by mixing with the food. There are three pairs of salivary glands, known as parotid, submaxillary, and sublingual. The parotid glands are seated on the sides of the face, between the ear and the lower jar; the submaxillary, beneath the horizontal part of the lower jaw; and the sublingual, beneath the tongue. They consist of numerous lobes and lobules, and are connected by vessels, ducts, and areolar tissue. The product secreted is conducted to the mouth by ducts. The amount varies, but the usual quantity is about three pounds per day, and in health it is always sufficient to keep the mouth moist. It contains but a small proportion of solids. Besides serving to moisten the food, it assists in mastication and swallowing, and its peculiar organic principle, called ptyalin, acting upon the starch of the food, begins the process of changing it into glucose or grape-sugar. Some mammals are destitute of salivary glands, and so also are some reptiles and most fishes.

SALLEE, a seaport town of Morocco, on the Atlantic coast, at the mouth of the Bu-Regreb, about one hundred miles west of

Fez. It occupies a site on the north side of the river, opposite the town of Rabat, and has manufactures of carpets, textiles, and utensils. Its importance is due to a considerable export trade in wool and fruits. It was long a haunt for pirates, but the practice was stopped by European powers in the early part of the last century, but Rabat was bombarded by the French in 1851. Sallee has a population of 12,125, of which about 3,000 are Jewish traders.

SALLUST (săl'lŭst), **Caius Sallustius Crispus**, eminent Roman historian, born at Amiternum, in the Sabine country, in 86 B. C.; died four years before the battle of Actium, in 34 B. C. He descended from a plebeian family closely connected with the Sabines, but after securing a liberal education rose rapidly to official distinction. In 59 B. C. he was made quæstor, and became a tribune of the people in 52 B. C., casting his fortune on the side of Julius Cæsar. He was elected prætor in 46 B. C. and soon after accompanied the latter on his campaign into Africa, where he was made governor of Numidia. His administration was oppressive. He enriched himself with such greed that he was accused before Cæsar, but escaped being brought to trial. After returning to Rome, he built vast improvements and gardens on the Quirinal, where he lived the remainder of his life and occupied himself in historical research. His writings are remarkable for their vivid portrayal of character, and because they are written in an excellent literary style. They contain many suggestions and accounts of value in military science and geography. The principal works include "Bellum Catilinarium," a descriptive history of Cataline's conspiracy; and "Jugurtha," or "Bellum Jugurthinum," a history of the war against the Numidian king Jugurtha from 111 to 106 B. C. His "Historiarum Libri V." is a treatise of public events from 78 to 66 B. C. Several other historical works have been attributed to him, but they are of doubtful authenticity.

SALMON (săm'ŭn), the common name of a class of food fishes belonging to the genus salmo. They are common to both salt and

SALMON.

fresh waters, and are particularly abundant in the North Atlantic. There are a number of well-known species, all of which are among the most important marketable fishes, but those of the North Atlantic are most widely distributed, ranging north of New York in North America and north of Spain in Europe. The usual length of the common salmon is from three to four feet, and the general weight from fifteen to thirty pounds, but specimens weighing fifty and even seventy-five pounds are not rare. The color of the adult fish is a steel-blue on the back and head, variegated with grayish or blackish spots, and merging into silvery-white beneath. Its flesh has a delicate reddish-orange color. It feeds on animal matter, particularly on minnows, small fish, and herring, but its food varies somewhat with the locality which it frequents. The salmon cannot be said to belong exclusively to either the marine or the fresh-water fishes, but its natural home is near the mouths and estuaries of the larger rivers. However, there are marine species that inhabit the deeper parts of the ocean, and a variety occurs landlocked in certain lakes in Maine and New York.

It is thought that the salmon obeys a natural instinct in migrating from the sea to spawn in the rivers. This migration occurs annually in the autumn, and after remaining for some weeks both male and female return to the sea. This migratory instinct is so great that rapids and waterfalls are no material obstacle against its advance toward the heads of rivers. Salmon have been seen to leap a height of sixteen feet, and failing to surmount the difficulty, successive trials have been observed. They possess a peculiar ability to suspend themselves and move upward in the falling water by a switch of the tail. The eggs are deposited in furrows made by the female in the gravel lying at the bed of the river, where they are covered by sand moved by means of the tail. Many of the eggs are carried away by the running water or eaten by trout and wild fowl, but these losses are compensated for by the immense fertility of the fish, many hundreds of eggs being deposited by a single female. The eggs hatch in a period ranging from seventy to 140 days. The young fish in its embryo state resembles a tadpole, being only about five-eighths of an inch in length and having a portion of the egg suspended below its body, which serves as food for several weeks. By the seventh week it has grown sufficiently to assume the form of a small fish an inch in length, and it begins to swim about in search of food.

The young salmon before its migration seaward is called a parr. In that stage it ranges from three to eight inches in length. When from one to two years old, it begins to assume a brilliant silvery hue and the fins become darker. It is now called a molt or salmon-fry, gathers in groups of from forty to seventy-five, and begins to move slowly toward the sea. On reaching brackish water, the salmon remain at rest for a short time, but soon take to the sea, where their life is unknown. It has been observed that their growth in the open sea is remarkably rapid, a molt weighing two ounces has been found to attain a weight of from six to ten pounds within a few months. After remaining about

three months in the open sea, they return to fresh water weighing from four to six pounds, and are known as grilse or salmon-peel. They are capable of depositing eggs when in the grilse state, and usually spawn shortly after reaching fresh water, but return soon after to the open sea to develop into the adult salmon. After a second stay in the ocean, ranging usually a period of several months, the salmon return to the fresh water, generally seeking the place of their birth. It is while they move from the sea to the spawning grounds that they are caught in large numbers.

Various means are used to catch salmon, among them seines, gill-nets, and various trap contrivances. Gill-nets contain meshes large enough to admit the head of the fish beyond the gills, but are not large enough for the fish to pass through, and when trying to escape they are held fast by the gills. Seines are drawn through the water, but in many places the pound net has taken their place. It is a net that may be set in the water, the fish being guided into it as they move up stream by a straight stretch of upright nets. Trap contrivances are stationary structures into which they are guided and caught. It is not difficult to understand that these devices may be used effectually, since in many streams the salmon force their way to the upper waters in such large numbers that the streams become almost choked. The Columbia, Sacramento, and Frazer rivers are among the most prolific sources of salmon in America, the catch in the Columbia River alone being about 1,500,000 salmon annually. Salmon fisheries of vast value were added to the United States by the purchase of Alaska. The annual catch on the entire Pacific coast of the United States and the Dominion of Canada is valued at about $3,500,000. There is danger that the supply will be exhausted in the course of time unless the rivers are replenished by the United States fish commission. Salmon fisheries of importance are found in the Elbe, Tay, and many other rivers of Europe north of Spain. The salmon common to the North Atlantic is generally known as salmon salar, and differs from the species found in the waters of northwestern America. Those found in the latter region include species known as dog salmon, quinnat or king salmon, silver salmon, and blue-black salmon. The salmon is eaten fresh and in a cured state, but in many regions the canned salmon are consumed most extensively.

SALONICA (sä-lō-nē'kä), or **Saloniki**, an important seaport of Europe, in Turkey, on the Gulf of Salonica. It occupies a beautiful site at the head of the gulf, which furnishes a safe and commodious harbor, but its streets are in a poor state of repair, and many of them are crooked and narrow. There are railroad connections with cities lying toward the north, which, together with its extensive steamboat lines, give the city an important interior and foreign trade. The trade is chiefly in cotton and woolen fabrics, grain, timber, tobacco, sponges, carpets, live-stock, and fruits. Among the manufactures are cotton textiles, woolen and silk goods, clothing, utensils, leather, carpets, and machinery. Its principal buildings include a number of mosques; the Christian churches of St. George, St. Sophia, and St. Demetrius; and a number of government offices. Among its ancient buildings is the citadel, situated on a rocky eminence, and in it are remains of a triumphal arch dating from the time of Marcus Aurelius. Remains of a Grecian hippodrome and Roman triumphal arches have been described by several writers. Salonica was first known as Therma, and is mentioned under that name in connection with the invasion of Greece by Xerxes. Cassander rebuilt it in 315 B. C. and named it Thessalonica, from which the present name was derived. It was the scene of many important military maneuvers throughout the early history of Europe. In 409 the Saracens conquered it after an extended siege. It was possessed by the Normans in 1185, and taken by the Turks in 1430. Its inhabitants at present consist of Spaniards, Jews, Greeks, Turks, and Albanians. Population, 151,230.

SALT, in chemistry, an acid whose hydrogen has been partly or wholly replaced by metal, as sodium chloride; or a compound formed by the union of an acid and a base, as nitrate of silver. The term is applied in a plural form to compounds that can suffer rapid double decomposition with another soluble substance. This is the case when mixing together solutions of nitrate of silver and chloride of sodium, which at once decompose each other and form nitrate of silver and chloride of sodium. The term is often applied to various compounds, such as acetate of ethyl, chloride of ethyl, and even to such fats as stearine and glycerine. In popular usage the term salts refers to Epsom salts, a saline purgative.

SALT, or **Chloride of Sodium**, a widely distributed compound, which has been used for seasoning and as a preserver of food from time immemorial. It is an essential ingredient of food for most animals, and supplies the chief source of soda and chlorine. Hence, it enters extensively into the market, and forms an important product for many uses in chemical and industrial arts. About three per cent by weight of the ocean is made up of it, and vast beds of salt occur in strata of all geological periods from the Silurian up. There are extensive productions of salt in the United States, and, for that matter, in nearly all parts of the world. Wild animals obtain it at salt-licks, to which they tread trails or paths. Traces of many trails may be seen in various sections of the western states and territories, most of which were made by elks and bisons. The salt of

the market is obtained by evaporating or freezing water taken from the ocean, or by mining in beds of rock-salt. In many regions it is obtained from the waters of saline lakes, springs, and wells. Brine springs result from rock-salt dissolving under the influence of subterranean streams, notable instances of this occurring in Kansas, Oklahoma, and other sections of the United States. Michigan has remarkable deposits of salt, particularly in the vicinity of Saginaw Bay, where millions of bushels are produced annually.

Vast deposits of salt occur in the Avery Island region of Louisiana. There the salt strata are reached at a depth of 250 feet below the surface. It is estimated that these deposits have a thickness of about 2,000 feet. Vast deposits of salt occur in Nevada and California, where valuable strata of rock-salt, brine springs, and saline marshes are abundant. The most celebrated salt deposits of Europe are in Prussia, where mines have been worked continuously since the 12th century. Other notable deposits occur in the Crimea, Caucasus, China, Persia, the Sahara Desert, and various parts of Australia. In many arid countries, as in parts of Australia, Eurasia, and some of the western United States, salt lakes are abundant. In the rainy seasons the lake basins are supplied with an abundance of water, but during the dry times vast deposits of salt form near the shore by the evaporation of the water. The annual production of salt in the United States is about 19,500,000 barrels. It represents a value of $8,150,000. Much of it is exported to Canada, Mexico, Central America, and the Hawaiian Islands. Besides serving as a preserver and seasoner of food, salt is used as a general mordant, for glazing coarse pottery, in giving hardness to soaps, and for imparting clearness to glass.

SALTILLO (säl-tēl'yō), a city of Mexico, capital of the state of Coahuila, sixty-five mile southwest of Monterey. It occupies a site in the fertile valley of the Rio Tigre, has well paved streets, several public buildings, and is a railroad center of considerable importance. Among the manufactures are cotton and woolen goods, clothing, and machinery. It was founded in 1586. Near it was fought the battle of Buena Vista in 1847. Population, 27,180.

SALT LAKE CITY, capital of Utah, in Salt Lake county, on the Jordan River, about ten miles from Great Salt Lake. The city is beautifully situated at the western base of the Wahsatch Mountains, and has a general altitude of 4,250 feet above sea-level. It has excellent railroad facilities, electric and gas lights, an electric street railway system, and substantial pavements. The Mormon Temple is one of its many excellent buildings, and is by far the most beautiful and costly. It was completed in 1892, and was formally dedicated on April 6, 1893, that being the 63d anniversary of the Mormon Church. This magnificent building was forty years in course of construction, and cost $12,000,000. It occupies the center of a group of buildings in the heart of the city, is 187 feet long, ninety-nine feet wide, and its loftiest tower is 223 feet high. This

MORMON TEMPLE AND TABERNACLE.

temple is surmounted by a statue of the angel Maroni, which is twelve feet in height and finished with gold-leafed plating. Other notable buildings include the county court-house, the Mormon Tabernacle, numerous churches, and many fine public schools.

The University of Utah is a non-sectarian, co-educational institution maintained by state support, and is situated on the site of Fort Douglas, which was granted by congress in 1893. It has a library of 25,000 volumes, thirty instructors, and 750 students. Though Salt Lake City is the chief seat of the Mormon Church, there are many non-Mormons, or Gentiles, in the city. Among the manufactures are paper, clothing, cigars, woolen goods, flour, machinery, leather, furniture, vehicles, and utensils. The surrounding country has extensive mining interests. It has been made highly productive by a vast system of irrigation, and yields cereals, fruits, grasses, and vegetables. The city has extensive smelting works, machine shops, and a large wholesale trade. Brigham Young founded it in 1847, at which time the region was far beyond settlements and was noted as an arid and waste country. Under the persevering influence and industry of the early settlers the region has been transformed into a district of fertility and wealth, and the city ranks among the most beautiful and prosperous of the United States. It has a growing trade in cereals, live-stock, and merchandise. Population, 1900, 53,531.

SALTPETER (salt-pē'tēr), or **Nitre**, a white crystalline substance, which has a saline taste. It is obtained by leaching from certain soils, in which it is produced by the process of nitrifaction; a method of oxidation in which nitrogenous vegetable and animal matter, in the presence of air, moisture, and some alkaline basic substances, is converted into nitrates. Native deposits of saltpeter occur in India, Persia, and other countries of Eurasia, but the commercial supply is now prepared largely from the deposits of nitrate of soda found in Chile and Peru. In preparing it a double decom-

position is effected between nitrate of soda and either potassium chloride or potassium carbonate. Solutions of the two substances are mixed in a boiling state, and the sodium chloride or carbonate is formed; being much less soluble in boiling water than the saltpeter, or potassium nitrate, it may be readily separated. Saltpeter crystallizes in six-sided prisms. It is used with common salt and sugar in curing meat; as an oxidizing agent, in glass making and in metallurgical operations; and in the manufacture of gunpowder and pyrotechny. It has an important place in pharmacy. Native nitrate of soda is valuable as a fertilizing manure, for which purpose large quantities are shipped from Chile and other South American ports.

SALTUS, Edgar Evertson, author, born in New York City, June 8, 1858. After studying in the schools of New York, he went abroad to study in Germany and France, and in 1880 graduated from Columbia College Law School. Soon after he began to devote his time to the study of literature, publishing his first work in 1884. His writings consist mostly of novels and essays, including "Pace that Kills;" "When Dreams Come True;" "A Transaction in Heart;" and "Truth about Tristan Varick." He is the author of a work in philosophy entitled "Philosophy of Disenchantment."

SALVADOR (säl-vä-dōr'), **Republic of,** the smallest of the Central American states, which is situated southwest of Honduras. It is 140 miles long from east to west, and has a area of 7,225 square miles. Much of the surface is gently undulating, but there are ranges of volcanic mountains traversing through the central part, with peaks ranging from 3,500 to 9,000 feet above sea-level. The Pacific coast is a generally level plain, from which valleys extend along the streams to the boundary of Honduras and Guatemala, and there is a considerable valley region running through the northern part. Its western boundary is formed by the Santiago River, and along its southeastern coast is the Gulf of Fonseca, a large inlet from the Pacific. The general drainage is toward the south. Its chief river is the Lempa, which is navigable a short distance, and the principal inlet is Jiquilisco Bay. The soil is remarkable for its fertility, and both the climate and rainfall are favorable to the production of cereals, grasses, fruits, and vegetables. Agriculture is the chief industry, and next to it is mining. Among the chief products are sugar, coffee, indigo, tobacco, balsam, maize, cotton, and timber. The mineral deposits include gold, silver, iron, copper, mercury, and coal. Cattle, horses, mules, and sheep are reared in abundance. Manufactures are in a primitive condition, but there are ample opportunities for material development, since the natural resources supply an abundance of material to render manufacturing enterprises profitable.

Salvador is divided into fourteen departments, and its government is modeled after that of the United States. The president is elected for a term of four years, and has the assistance of a cabinet of four departments. Legislative authority is vested in a congress of seventy representatives, elected by popular vote for terms of one year, and the judicial power is vested in a supreme court and a system of inferior courts. The standing army numbers about 4,250, and the national militia is placed at 18,000 men and officers. The navy is not of material importance, including only a few ships and gunboats. Education is free and attendance at school is nominally obligatory. Besides the elementary schools, there are high schools in the towns and cities, two normal schools, and a national university with faculties of law, medicine, sciences, and engineering. Twenty newspapers are published, mostly in the capital city. The total railroad mileage is given at 280 miles, and there are about 2,500 miles of well improved highways and several canals. The telegraph lines include 2,575 miles with 175 offices, and there is a general postal system. Roman Catholicism is the established religion, and Spanish is the official language.

Salvador was long known as Cuscatlan. It was conquered for Spain by Pedro de Alvarado in 1525. It became independent from that country in 1821, when it joined the Mexican confederation, but became an independent republic in 1853. The present constitution was adopted in 1864, but it has since been revised several times. Salvador is the most densely populated republic of Central America, but its material progress has been retarded considerably by local dissensions and revolutions. San Salvador is the capital and largest city. Other cities include Santa Ana, Sonsonate, New San Salvador, San Miguel, and Sensuntepeque. Sonsonate is one of the leading commercial cities, and has railroad connections with the interior. A large per cent. of the population of Salvador consists of aboriginal and mixed races, only about 20,000 being Europeans. Population, 875,584.

SALVATION ARMY, an organization formed in England by William Booth in 1865, and whose mission is the salvation of mankind by spreading the Gospel. In this work he was assisted by his wife, both of whom had formerly been members of the Methodist New Connection. After conducting a mission in the east part of London, at which many depraved persons were changed into earnest converts, the mission was reorganized and called the Salvation Army, and by this name it has been known since 1878. Military phrases were generally adopted, the leader being called a general; evangelists, officers of different grades; and candidates, cadets. The uniforms differ according to the customs of a country, but are quite similar in the United States, Australia, and

the countries of Europe, while in parts of Asia red or white garments are most prevalent. Everywhere the army prepares a map on which the country is represented in districts, and each is placed under the charge of a major. This officer is assisted by one or more corps under a captain, who is assisted by lieutenants. The army was equally applauded and opposed from the first, but in its quiet way it has won a large following, everywhere practicing self-denial and coming in touch with the common people. Both men and women wear characteristic uniforms, the latter being distinguished principally by poke-bonnets with red trimmings, and in this manner parade the streets with banners, drums, timbrels, and songs. Crowds are induced to assemble at convenient places, and after a brief service the parade is conducted by the leader to the church or hall, where the services are continued. Members are pledged to temperance, unselfish lives, and belief in the Bible, and each is encouraged to give glad obedience and lead a spiritual, enthusiastic, Christian life. There is no distinction between the sexes as to rank, duty, or opportunity, and all persons are welcome to membership with a spirit of good cheer and devotion.

The army made its first appearance in France in 1880, and in the same year began its crusade in the United States. Ballington Booth took charge of the American branch in 1883, but in 1896 organized a separate society known as The Volunteers. Booth-Tucker is at present the commander of the Salvation Army in the United States. The army has 775 stations in this country, 3,250 officers, 25,000 active workers, and about 425,000 members. It maintains 150 relief stations and a number of educational institutions. The total membership in the world is growing rapidly, and the work is conducted in thirty-five different languages. The "War Cry" is its principal publication. It is issued in England, but there are editions in French, German, and Swedish in New York City. Other periodicals include "Young Soldier," "Conqueror," "Harbor Lights," and "Social News." General Booth published his "In Darkest England and the Way Out" in 1890, with which he laid the foundation for providing means to establish places of work for the homeless.

SALVINI (säl-vee'nee), **Tommaso**, eminent tragedian, born in Milan, Italy, Jan. 1, 1830; died Dec. 15, 1896. He descended from a family of actors, and after securing a liberal education, became connected with the Royal Theatre at Naples. In 1849 he took part in the Italian Revolution, but soon after resumed stage life. His greatest success was attained on the 600th anniversary of Dante's birth, which was celebrated at Florence in 1865, when he took the part of Lancelotto in the tragedy, "Francesca di Rimini." He visited the United States in 1875 and in 1881, and both times obtained remarkable success. It may be said that his success rested on his perfect elocution and dramatic power, but these were reënforced by noble bearing and his splendid physique. He retired from the stage in 1884 to take up his residence in Florence. His chief parts were Saul, Hamlet, Orosmanes, and Othello. King Victor Emmanuel conferred upon him the honor of knighthood. His son, Alexander Salvini, is an actor of eminence.

SALWIN (säl-wĕn') or **Salween**, an Asiatic river, rises in Central Thibet, and after a general course of 800 miles toward the east and south flows into the Gulf of Martaban, an inlet from the Indian Ocean. There are several lakes in its upper course, and its valley through Burmah is highly fertile. Rapids obstruct navigation, but steamboats ascend as far as Moulmein, to which place large quantities of teak and other timber are floated. The basin of the Salwin includes 62,750 square miles.

SALZBURG (sälts'bŏŏrg), a city of Austria, on the Salzach River, sixty-two miles southeast of Munich, Germany. It occupies a beautiful site on both sides of the river, which is crossed by several bridges. It has railroad conveniences, and is the seat of government of the province of Salzburg. Among its buildings of note is the castle of Hohen-Salzburg, a fine structure dating from the 11th century. During the Middle Ages it was the seat of archbishops, who held the rank of princes of the German Empire. Salzburg has a fine cathedral, numerous hospitals and educational institutions, and a statue of Mozart, who was born there. The manufactures include musical instruments, clothing, pottery, and machinery. The surrounding country is highly fertile, and the city is one of the most beautiful in Europe. Population, 28,644.

SAMAR (sä-mär'), an island of the Philippines, situated southeast of Luzon, from which it is separated by St. Bernardino Strait. It has an area of 5,800 square miles. Its coast line is indented by many gulfs and bays, and its surface is more or less mountainous. The soil is remarkable for its productive fertility. It has vast forests of valuable timber and mineral deposits of considerable value. Horses, cattle, and swine are reared in abundance. Among its principal products are timber, palm oil, rice, tobacco, hemp, cocoa, and fruits. Cathalogan, population 6,072, is the capital. Population, 1901, 185,386.

SAMARA (sä-mä-rä'), a city of southeastern Russia, capital of the government of Samara, at the confluence of the Samara and Volga Rivers. It has an important river and railroad trade with Russian and foreign cities. Among the manufactures are soap, leather, machinery, clothing, and spirituous liquors. The noteworthy buildings include a government house and many fine schools. It is one the chief grain markets on the

Volga, and there is a large trade in live-stock, fish, tallow, and salt. Electric railways, pavements, and waterworks are among the improvements. Population, 96,320.

SAMARANG (sä-mä-räng'), an important seaport of Java, on the north shore, 380 miles east of Batavia. It is the third city of the island in population and commercial importance. The city has a good harbor, which has been improved by the construction of docks and wharves. It is the seat of a growing trade in coffee, tobacco, rice, sugar, indigo, and fruits. A railroad line has been built inland. The inhabitants consist largely of Malays, Arabians, and Chinese, but it has a fair proportion of European business and professional men, who maintain churches, schools, and several institutions of higher learning. The part of the city occupied by the Europeans has well improved streets and modern facilities. Population, 67,340.

SAMARIA (sa-mā'rĭ-a), an ancient city of Palestine, the capital of Israel from the time of Omri to the fall of the kingdom. It occupied a steep hill, called Shomeron, in the center of Palestine, and was so named because the hill forming the site resembled a watch-mountain. We read in the I. Kings, "And he (Omri) bought the hill Samaria of Shemer for two talents of silver, and built on the hill, and called the name of the city which he built, after the name of Shemer, owner of the hill, Samaria." It is thought the purchase was made in 925 B. C., when Samaria became the seat of government. It was unsuccessfully besieged by the Syrians in 872 B. C., but Shalmaneser, king of Assyria, captured it in 721 B. C., after a siege of three years. About that time Sargon succeeded Shalmaneser and carried the Hebrews into Babylonian captivity, while their own lands were occupied by colonists from Assyria. From the Jews remaining in Samaria and the Assyrian colonists rose the Samaritans, a powerful religious sect. Though embracing the religion of Israel, they were refused permission to aid in rebuilding the temple at Jerusalem, and accordingly built a rival temple on Mount Gerizim in 409 B. C. Henceforth the two classes were at enmity with each other, which ultimately ended in a war and the destruction of Samaria under John Hyrcanus, a Jewish leader, in 109 B. C. It was made a Roman colony in the third century but declined after the Mohammedan conquest, and on its site is the village of Sebustieh. The Samaritans still exist as a religious sect, but differ from the Jews in that they reject the traditions and hold only to the Pentateuch, of which they possess their own version.

SAMARKAND (säm-ar-känd'), or **Samarcand**, a city of Asiatic Russia, in western Turkestan, 128 miles east of Bokhara. It is situated on the Trans-Caspian railroad, and is surrounded by a fertile plain. Among its noteworthy buildings are several dating from the early historic period. They include three sacred colleges, situated in the center of the city, and the palace of the emirs of Bokhara, which has been converted into a hospital by the Russians. It has a considerable trade in cereals, salt, live-stock, and fruits. The manufactures include woolen and silk textiles, pottery, clothing, leather, utensils, and machinery. Samarkand was captured by Alexander the Great while on his march to southern Asia. It became a sacred Moslem city after Arab occupation in 712 A. D., and in the 14th century it was made the capital of the great empire of Tamerlane, when it had a population of 150,000. The Russians annexed it in 1868. They have garrisoned it and greatly improved its streets and enlarged its trade. Population, 35,990.

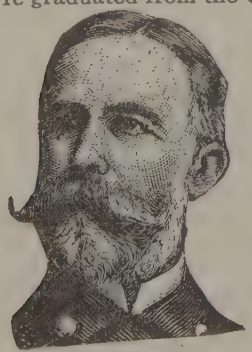
SAMOAN ISLANDS (sä-mō'ăn) or **Navigators' Islands**, an island group in the Pacific Ocean, about 3,000 miles west and 2,000 miles south of the Hawaiian Islands. It embraces twelve islands, but only three are of particular importance. These are Upolu, Savaii, and Tutuila, the last named belonging to the United States and the remainder of the group to Germany. The area of the group is 1,700 square miles. These islands are of volcanic origin, but in some regions are characterized by coral additions and reefs. Their surface is diversified by hills and mountains, but in the main it is remarkably fertile, with an abundance of wood and luxuriant vegetation. No native fauna prevails in the islands; its only indigenous animal is a species of bat. The principal productions are cotton, coffee, sugar, tobacco, cocoanuts, copra, and many varieties of fruits. Cattle, horses, swine, sheep, and poultry have been imported within recent years and are now raised successfully. The islands are of importance for their location on the direct route between the proposed Nicaragua Canal and the East Indies.

The natives of the Samoan Islands are of the brown Polynesian race, and were long governed by a native king. They engage principally in fishing and fruit culture. In 1889 an agreement was effected whereby the islands became neutral under a protectorate of Germany, the United States, and Great Britain. After complications in regard to the election of a king, a different treaty was made, and all but Tutuila passed to the possession of Germany. This treaty was ratified by the United States in 1900. Tutuila has an area of fifty-four square miles, and on its shore is the fine harbor of Pago-Pago. Savaii is the largest island of the group, having an area of 658 square miles, and Upolu has an area of 340 square miles. The latter contains the town of Apia, with a population of 1,950. It is the capital of the German possessions. There are regular steamship communications with American, Australian, and Asiatic ports. Population, 36,480.

SAMOS (sā′mŏs), an island off the coast of Asia Minor, in the Ægean Sea, forty-five miles southwest of Smyrna. It has an area of 180 square miles, and forms a principality of Turkey. The surface is diversified by a range of mountains, of which Mount Kerkis is the culminating peak, 4,730 feet high. It has an abundance of timber, a fine climate, fertile soil, and adequate rainfall. The principal products include corn, olive oil, raisins, wine, skins, and fruits. It has valuable deposits of iron, lead, marble, and other minerals. Among the manufactures are leather, spirituous liquors, utensils, clothing, carpets, pottery, and textile fabrics. Anciently Samos was one of the most famous Grecian islands, and formed a powerful member of the Ionic confederation. It possessed a powerful navy, and under Polycrates, in 532 B. C., it was the most powerful island of the archipelago. It became a Roman province in 84 B. C., and its capital was made a free city. Samos was conquered by the Turks in 1550, and did not rebel against Turkish rule until in 1821. Though that war established the independence of Greece, Samos remained a Turkish possession, but since 1832 its government has been administered under a Greek prince, tributary to the sublime porte. Chora is the chief town. Population of the island, 44,110.

SAMO-THRACE (sä-mō-thräs′), an island in the northern part of the Ægean Sea, belonging to Turkey. It is the most elevated island of the Grecian Archipelago. Its area is given at sixty-five square miles. The highest peak, Mount Saoce, is 5,245 feet above sea-level. This mountain may be seen from the Plains of Troy. From its summit Poseidon watched the decisive contest in the Trojan War. It has no harbor of importance, but has a considerable area of fertile soil, and is particularly celebrated in history as the scene of sacred worship to the Cabeiri. The inhabitants aided Xerxes in the battle of Salamis. Population, 2,375.

SAMPSON, William T., naval officer, born in Palmyra, New York, Feb. 9, 1840. He graduated from the United States Naval Academy at Annapolis in 1861, entering the navy the same year as master, and the following year became lieutenant. In the Civil War he was on the practice ship John Adams and the monitor Patapsco, serving on the latter when it was destroyed at Charleston in 1865. During the next two years he served in the European squadron, became commander in 1874, and captain in 1889. He had superintendence of the Naval Academy from 1886 to 1890, becoming commander of the San Francisco in the latter year. From 1892 till 1897 he was chief of the bureau of ordnance, and at the beginning of the Spanish-American War succeeded to the command of the North Atlantic squadron. President McKinley appointed him commodore on July 3, 1898, and after the battle of Santiago, fought on the latter date, made him rear-admiral. On Aug. 16, 1898, he was made one of the commissioners to arrange for the Spanish evacuation of Cuba. He died May 6, 1902.



WILLIAM T. SAMPSON.

SAMSON, one of the judges of Israel, son of Manoah, who flourished about 1116-1096 B. C. He was of the tribe of Dan, a native of Zorah, and is noted as a hero of the Israelites and an avowed enemy of the Philistines. He became a Nazarite at birth, and his head remained unshorn and his lips never tasted of the wine. It is recorded that he was endowed with peculiar physical power, which enabled him to tear a lion to pieces. His great strength caused him to slay 1,000 Philistines, and to carry away the gates of Gaza. He became enamored of Delilah of Sorek, to whom he imparted the secret that his physical strength was due to his hair, which had never been shorn. She soon after deprived him of this endowment by cutting off his hair, but with the growth of it his strength returned, and on the occasion of the festival of Dagon, Samson avenged himself against the Philistines, who had blinded him in the absence of his strength, by pulling down the pillars of the building in which they had assembled, but perished with them. Milton's "Samson Agonistes" is a drama that makes use of the story of Samson's death.

SAMUEL, the last judge of Israel, and the first of the order of prophets. He was the son of Elkanah and Hannah, who dedicated the child to the Lord. His training was in the sanctuary at Shiloh, under the teaching of Eli, the high priest, and while there he received the first prophetic call. Twenty years after the death of Eli he assumed the judgeship of Israel, and after gathering the Israelites at Mizpah, he conducted a successful expedition against the Philistines. During his reign of twenty years the worship of Jehovah was restored, and when the people in his old age asked for a king he anointed Saul. When the latter failed in discharging his duties, he anointed David as king of Israel, but died before the contest between the two was terminated successfully in favor of David. He is credited by some writers with the authorship of the Book of Judges and a part of the books of Samuel.

SAN ANTONIO (sän än-tō′nĭ-ō), a city of Texas, in Bexar county, on the San Antonio River, eighty miles southwest of Austin. It is an important railroad junction, giving it connection with other trade empo-

riums. It has electric lights and street railways, fine public schools, and substantial street pavements. The notable buildings include a fine courthouse, several hospitals, and an excellent United States government building. Among the manufactures are tobacco products, baking powder, cottonseed oil, hardware, furniture, machinery, cement, and farming implements. The city is the seat of a Roman Catholic cathedral and numerous other churches, and has a public park, several libraries, and a number of scientific and educational associations. Two miles north of the city is Fort Sam Houston, a United States military post, which occupies a reservation covering 470 acres. San Antonio was founded by the Spaniards in 1714. Soon after the annexation of Texas many Germans settled there, and the city and surrounding region developed rapidly. At present it is the center of a large trade in cereals, merchandise, live-stock, and manufactures. Population, 1900, 53,321.

SAND, the particles of granular stone that are coarser than dust and finer than gravel. It results from the gradual disintegration of rocks under the action of water, but also from other causes, such as the detachment of particles from bowlders and pebbles under the movement of particles due to frost, wind, or water. The color of sand corresponds to that of the minerals in the rock from which it is derived. In many places vast deposits of sand form under the action of water, as along the seacoast in consequence of wave action and in streams from the effect of running water. Extensive strata of sand were formed in different geological periods, occurring at various depths, and ranging in thickness from a few inches to many hundreds of feet. In many places are deposits that are due to the action of wind, as in desert regions, where the dry sand is carried and deposited in drifts or sheets. In many places these extend into the sea, as on the western coast of North Africa. In some regions, as in Poland, the sand deposits were formed largely by the action of glaciers, while on the coasts of many islands and continents vast dunes were formed. Similar sand deposits are still forming under the action of sea-waves and currents. Sea-sand often contains minute fragments of shells, particles of sponges, and other remains of animal matters. Siliceous sands serve many important purposes, among them the manufacture of glass and the preparation of mortar. They are used in making molds for casting, preparing filters, and improving dense clay soils for cultivation. Deposits of valuable minerals occur in many sand deposits, among them gold, copper, tin, diamond, iron, etc.

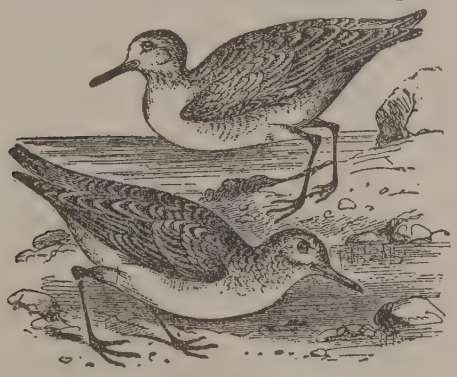
SAND, George, eminent novelist, born in Paris, France, July 5, 1804; died June 7, 1876. She was the daughter of Lieutenant Maurice Dupin, who died when she was four years of age. Her maiden name was Armantine Lucile Aurore Dupin, but she is generally known by her nom-de-plume, George Sand, and as Aurore Dudevant, her marriage name. After receiving an education in a convent in Paris, she was married to M. Dudevant in 1822, but in 1831 became separated from her husband and engaged in literary work. Her first work was written in conjunction with Jules Sandeau, a lawyer of Paris, and consisted of a romance entitled "Rose et Blanche." After that many novels came from her pen, and a number of them possess such literary value that she may be regarded one of the greatest of French novelists. She was associated with many leading literary men of her time, both in France and foreign countries, and to enrich her mind visited several European capitals to consult libraries and come in contact with works of art. It may be said that she was superb as an artistic writer, devoting much of her efforts to the cause of human progress, and treating her subjects in a marked purity and simplicity of language, through all of which runs a vein of practical good sense. Among her best known works are "Valentine;" "Andre;" "Indiana;" "Lelie;" "Leone;" "Leoni," and "Mauprat." She published an interesting work entitled "History of My Life."

SANDAL-WOOD (săn'dal-wŏŏd), the wood of any one of several trees of the sandal-wood family. These trees are native to the East Indies and other islands of the tropical regions of the Pacific. Sandal-wood trees are greatly-branched evergreen trees, with opposite leaves, and compact and fine-grained wood. They are peculiar for yielding a highly fragrant wood, from which perfume is derived, but it is used more largely for the manufacture of ornamental products, such as desks, glove-boxes, and other light articles. A large number of species have been described; the best known varieties are the white, yellow, and red sandal-wood. Most species do not grow to more than a foot in diameter. The Indian sandal-wood trees attain a height of thirty feet and mature in twenty to thirty years. A thick, viscid oil is expressed from the seeds. It is used by the poorer classes of India for illuminating purposes. Only the heart wood is employed for sandal-wood oil, from which perfume is made, but it is also used for incense and in painting sacred figures. Several species of trees native to the Hawaiian Islands yield a sandal-wood remarkable for its fragrance and the presence of a valuable oil.

SAND BLAST, an apparatus for propelling a jet of sand, which is utilized in engraving and cutting glass. The sand is blown by means of air or steam with great force from a tube. When the stream is directed against the article to be cut or engraved, it acts with remarkable rapidity, and as soon as the stream is turned off the article acted upon is left in a clean condition

for the inspection of the workmen. The sand blast was invented by B. C. Tilghman, of Philadelphia, and is now employed largely in engraving goblets, glass household utensils, and glass globes for lamps and gas-burners. The apparatus may be used in engraving patterns on marble and metals, a paper or lace figure being placed on the surface to protect the parts that are to remain untouched.

SANDERLING (săn'dĕr-lĭng), a class of wading birds of the snipe family, which are widely diffused in the northern hemisphere.



SANDERLINGS.

Birds of this species breed in the Arctic regions, both in America and Eurasia, and on the approach of winter move southward as far as Brazil and Africa. Their plumage is a reddish tinge with dark markings in the spring, and an ash-gray in the winter. They are about eight inches in length, with an alar extent of thirteen inches. Sanderlings feed on worms, small crustaceans, and tender plants. They are esteemed as a food.

SANDHURST, an Australian city, in the province of Victoria, ninety miles northwest of Melbourne. It has a number of important railroads, and is surrounded by a region remarkable for its vast deposits of gold ore. The streets are beautifully platted and improved, and there are many fine schools, churches, hotels, and public buildings. The city has fine waterworks, electric lights, a public park, and botanical gardens. It is the seat of a hospital, a benevolent asylum, and a mechanic institute. Among its manufactures are machinery, earthenware, leather, clothing, spirituous liquors, vehicles, and furniture. The surrounding country is noted for its excellent farms and orchards. About 5,500 miners are employed in the gold fields. Population, 45,318.

SAN DIEGO (săn dē-ā'gō), an important seaport city of southern California, county seat of San Diego county, on the Pacific coast. It is the focus of several railroads, has a good harbor on San Diego Bay, and in the surrounding country are extensive orchards of tropical fruits, including oranges, olives, date-palms, figs, and grapes. The city has an excellent public school system, gas and electric lights, electric street railways, and many valuable municipal improvements. Among the manufactures are tobacco products, boilers, hardware, machinery, carriages, canned fruit, flavoring extracts, wine, and leather. North of the city is the old town of San Diego, which is noted as the oldest in California, and a lake of boiling mud half a mile long is a short distance from the new city. Coronado Beach, a popular summer resort, is opposite San Diego, on the south side of San Diego Bay. It contains a fine hotel erected at the cost of about $1,000,000, which has ample accommodations for 1,200 guests. Near San Diego is a fine monument to Richard A. Proctor. San Diego county is remarkable for its fertility, and ranks as the chief honey-producing region of the state. San Diego had a population of 2,638 in 1880 and 16,159 in 1890. Population, 1900, 17,700.

SAN DOMINGO, the capital of the San Domingo Republic, on the south shore of the island of Hayti. It is located at the mouth of the Ozama River, where it was founded by Bartholomew Columbus in 1496, and is the oldest European city in America. Its streets are broad and regularly platted, intersecting each other at right angles. The harbor is spacious, has good anchorage, and is the scene of considerable trade in tobacco, fruits, cotton, and sugar. Among the principal buildings is a cathedral dating from 1540, in which the remains of Columbus were preserved from 1536 until 1794, when they were removed to Havana. Other buildings of importance include the capitol and a university. It has several hospitals, schools, and churches. San Domingo is the seat of a bishop's see and an arsenal. Population, 25,160.

SAN DOMINGO, or the **Dominican Republic**, a government comprising the eastern part of the island of Hayti, the western part being the Republic of Hayti. It includes the larger but less populous portion of the island, and has an area of 18,045 square miles. Three principal mountain chains traverse San Domingo. The largest chain trends through the central part, while one lies along the northern coast, and the other chain extends from the Hayti Republic into the southwestern region. The surface is generally fertile, and includes great plains and savannahs, the most extensive lying in the southern part and between the central and northern mountain ranges. Among its principal rivers are the Rio de Yaque and the Youna. The coast plains are extensive, except in the northern part, and are drained by numerous small streams. The climate is generally favorable and healthful. However, the extensive natural resources have not yet been developed to a material extent. It has considerable deposits of gold, iron, copper, salt, coal, and other minerals. Valuable forests of logwood, mahogany, pine, satin-

wood, fustic, and lignum vitæ are abundant. Agriculture is the principal occupation. Fully 15,500 square miles of the surface are fit for cultivation. The principal products are sugar-cane, coffee, rice, molasses, tobacco, cotton, beeswax, and fruits. It yields an abundance of fish products and domestic animals, the latter including mules, horses, cattle, and poultry. Foreign commerce is not material. The principal exports are tobacco, coffee, timber, sugar, and fruits; while the imports consist largely of manufactured articles, earthenware, and clothing.

At the time Columbus discovered the island of Hayti, in 1492, there was a population much greater than at present, but many of the aborigines perished under Spanish control. A formidable revolt against the Spanish took place in the 17th century, which resulted in the western part of the island being ceded to France in 1697, but the eastern part, now mainly forming the San Domingo Republic, remained a Spanish possession. A Negro revolt against France, in 1791, soon brought the entire island under the control of Toussaint L'Ouverture (q. v.), who made it an independent republic. Soon after he fell into the hands of French captors, but Dessalines drove the French out in 1803. However, he was assassinated in 1806. Insurrections and revolutions occurred at various times, but France recognized the republic in 1825, and Spain finally evacuated the island in 1865. Since then the two republics have existed with more or less change and uncertainty, disturbances being due largely to dissatisfied and restless elements made up of people of mixed blood. Among the latest disturbances in the San Domingo Republic was a revolution in 1898, which terminated in the assassination of the president on July 26, 1899.

The government is under a constitution that vests the chief administrative authority in a president. The chief executive is chosen by an electoral college for a term of four years, and has the assistance of a departmental cabinet. Legislative power is vested in a congress of twenty-two deputies elected by direct vote, and the judicial in a supreme court of justice. The judges of the supreme court are appointed by the president, and under them is a system of courts of first instance and local justices. Spanish is the prevailing language. It has a system of public education, comprising primary and secondary schools. These schools are supplemented by a normal school and several institutions of higher learning. Attendance upon the elementary schools is free and nominally compulsory. Roman Catholicism is the state church, but other denominations are tolerated under certain restrictions. The inhabitants embrace a comparatively large per cent. of whites, but they are chiefly mulattoes, mestizos, and Negroes. San Domingo is the capital, and Puerto Plata is the chief port city. As a general rule the highways are in a poor condition. The railroads open to traffic extend about 280 miles, and the telegraph lines 575 miles. Population, 615,500.

SANDPAPER, the commercial name of a stout paper covered with sharp sand or ground glass, which is embedded in glue. It is used for smoothing or polishing ivory, wood, bone, and other material. The paper employed in making this product is usually of a stiff brown kind, which is covered with glue and afterward the sand is sifted on. Sandpaper is made of various sizes, and there are different grades. The coarser material is used for less delicate work, while the finer is made of very small grains of sand and used for polishing or smoothing surfaces of a delicate kind. Emery paper differs from sandpaper in that emery is used in the former instead of sand.

SANDPIPER, an extensive group of wading birds of the snipe family. They are found in large numbers in swampy regions,

SANDPIPER.

on the shores of the sea, and on the banks of rivers, lakes, and ponds. They are migratory, moving far northward in the spring. Several species migrate as far as Greenland, Spitzbergen, and Nova Zembla. The common varieties include the dunlin, red, little stint, purple, wood, ruff, green, and summer sandpipers. These birds are found in all parts of the world where water is abundant. They have long legs, a long slender bill, and a short tail, and are quite active and graceful. They run and fly with rapidity, and enjoy wading in shallow water in search of food, which consists of insects, mollusks, worms, and the tender parts of plants. The purple sandpiper is the most common American species. In all species the summer plumage is different than that of winter, and they are prized for their flesh, which is both tender and well flavored. The voice is unmusical, and may be heard for some distance as the bird flies through the air or runs along in the shallow water.

SANDSTONE, a class of rocks formed of particles of quartz sand cemented together with silica. Many different kinds of sandstone occur in nature, varying in composition from grains of quartz scarcely visible to the naked eye to coarse formations composed

FROM COL. CHI. ACAD. SCIENCES
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SPOTTED SANDPIPER.
(Actitis macularia).
½ Life-size.

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of pebbles and gravel. The color differs according to the sand forming them, usually varying from gray to reddish-brown, but in many cases there is a mixture of different colors, due to the presence of particles of mica, feldspar, granite, flint, and other substances. A marked difference is observable in the consistency; some are quite soft and porous, while others are very hard and durable. Sandstone of fine grain and uniform color is usually preferred for building purposes, while the coarser-grained varieties are useful in making millstones for grinding cereals. The latter kind is used for whetstones and grindstones. Vast formations of sandstone are met with in deposits of different geological ages, most of which are stratified horizontally, but in some cases they are in an inclined or vertical position. Many of the buildings in New York City are of the dark-brown sandstone secured in New Jersey. Deposits of sandstone of value in building occur in many of the states.

SANDUSKY (săn-dŭs'kĭ), a city of Ohio, county seat of Erie county, on Sandusky Bay, near Lake Erie, fifty-five miles west of Cleveland. It is beautifully situated at the mouth of the Sandusky River, is an important railroad center, and has an excellent harbor. Sandusky has extensive wharves, and a large lake trade in limestone, salt, fish, wool, lime, coal, flour, cereals, and live-stock. The streets are beautifully paved, and intersect each other at right angles. Gas and electric lights, street railways, waterworks, and an extensive sewerage system are among the improvements. Its manufactures embrace engines, boilers, railroad cars, machinery, spirituous liquors, edged tools, lumber products, and farming implements. The city has excellent public schools, numerous churches, and elegant city and county buildings. Many of the structures are of stone taken from quarries in its vicinity. It is the seat of the Ohio Soldiers' and Sailors' Home and of the state fish-hatchery. It is one of the largest fresh-water fish markets in the United States. Population, 1900, 19,664.

SANDWICH ISLANDS. See **Hawaiian Islands.**

SANDY HOOK, a peninsula extending from Monmouth county, New Jersey, to the entrance of New York harbor. It is a low and sandy point of land about nine miles long. At its northern end is the Sandy Hook lighthouse, ninety feet high, and immediately south of it are fortifications for defending the entrance to New York harbor. In connection with the government fortifications is a proving-ground, at which armor-plate and ordnance are tested.

SANDYS (săn'dĭs), **Sir Edwin**, statesman, born in Worcester, England, in 1561; died in 1629. After graduating at Oxford University, he became an active supporter of the claim of James I. to the throne, and in 1603 was knighted. He was a member of the Virginia Company, and while holding office in that concern he instituted many reforms in the American colonies. He published "Survey of the State of Religion in the Western Parts of the World."

SAN FRANCISCO, the largest city of the Pacific coast, situated in California, on San Francisco Bay. It occupies a fine site on a peninsula lying between the Pacific and the Bay of San Francisco, and on the opposite shore of the bay is Oakland. San Francisco Bay is about forty-six miles long from north to south, from six to ten miles wide, and north of it is San Pablo Bay, a body of water about ten miles long, which receives the discharge from the Sacramento and San Joaquin rivers through Suisun Bay. The Golden Gate, a strait five miles long and a mile wide, connects San Francisco Bay with the ocean. Among the islands near the city are Alcatraz, Goat, and Angel islands, and in San Pablo Bay is Mare Island, which is used as a government navy-yard. The shores of the bays near San Francisco are generally formed of precipitous cliffs, particularly those of the Golden Gate, and the whole region is one of remarkably picturesque scenery. Steamboat connections are maintained with all the principal ports of the world, and ample railroad facilities have been provided to connect with the country toward the interior, thus making the city an extensive trade emporium. The custom-house receipts aggregate annually about $9,500,000; the total imports about $50,500,000; and the total exports $40,750,000. A considerable part of the foreign trade is in wheat, manufactures, live-stock, metals, and fruit. The manufacturing establishments represent a capital of $85,500,000. They give employment to 50,500 persons, and their annual products are valued at $150,725,000. The principal manufactures are sugar, molasses, canned fruit, clothing, boots and shoes, flour, leather, packed meat, tobacco products, earthenware, saddlery, furniture, glass, cordage, machinery, and sailing vessels.

The city is substantially built, having well improved streets, public parks, and durable pavements. Rapid transit is provided by cable and electric railways, the former being especially serviceable in traversing streets of an undulating character. Many of the largest buildings are of marble, iron, and granite, but in the older and outlying parts of the city a preponderance of wooden buildings is still noticeable. Among its largest buildings are the stock exchange, government mint, city hall, county courthouse, Chronicle building, and Mills building. The Palace Hotel, one of the finest in America, cost $3,250,000 and has ample accommodations for 1,200 guests. San Francisco has many fine churches, including an Episcopal cathedral, Roman Catholic cathedral, the Sherith Israel Synagogue, and Grace Church. The public schools are well repre-

sented in kindergartens, elementary and high schools, and higher education is well provided for in colleges and institutes. The higher institutions include the Academy of

THE PALACE HOTEL.

Sciences, Mechanics Institute, Mechanical Art School, Hastings College of Law, Hahneman Medical College, Cooper Medical College, Cogswell Polytechnic College, St. Ignatius College, the dental department of the University of California, and numerous other private and public institutions. All the leading civic, scientific, and educational associations are represented in strong organizations. The city library has 65,000 volumes, and there are many excellent libraries in the different higher institutions. The most noted attraction is the Golden Gate Park, including 1,050 acres, bordering on the shore of the Pacific. It was originally a barren waste of sand dunes, but has been improved by walks and driveways, and beautified by many rare shrubs and flowers. The city has a number of other parks, a zoölogical garden, a number of excellent monuments, and vast systems of sewerage and waterworks. Electric and gas lights are well distributed in all parts of the city, making it in every way modern, agreeable, and beautiful.

Spanish Franciscan monks first occupied the site of San Francisco in 1776 by planting there the mission of San Francisco de Asis, and a Spanish military post was established in the same year. The village of Yerba Buena took its place in 1835, and at the beginning of the Mexican war in 1846 the region was taken possession of by the United States, and the name changed to San Francisco in 1847. From that time to the present the history of the city reads like a fairy tale. Many incidents of special interest are connected with the events occasioned by the discovery of gold in 1848, when people from all parts of the world gathered there and made it the center of remarkable enterprise. Destructive fires did great damage in 1849-51. These catastrophes were attended by more or less lawlessness, resulting from the coming together of large numbers who were attracted there by the reports that fortunes could be made in a few days. However, these primitive conditions were soon overcome by the organization of vigilance committees, who summarily hung and imprisoned many of the lawless leaders. Since then the city has been enjoying a continuous era of prosperity, and has become the center of great wealth, refinement, and education. Few cities in America are composed of as many different elements, and none have shown greater enterprise. The inhabitants include Greeks, Germans, Maltese, Spaniards, and other classes of Europeans. About 25,000 Chinese are in San Francisco, but they are confined largely to their own quarters. It ranks as the ninth city of the United States. Population, 1900, 342,782.

SAN GERMAN (sän jĕr-män'), a city of Porto Rico, in the province Mayaguez, about eight miles southeast of the city of Mayaguez. It is situated near the Rio Grande River, has a considerable trade and manufacturing interest, and in its vicinity are valuable forests and plantations. The first settlement was made there by the Spanish in 1543. Population, 1900, 3,954.

SANGIR ISLANDS (sän-gēr'), an island group of Malaysia, situated between Celebes and the Philippines. It is a possession of Holland. The group comprises many small islands, of which Great Sangir is the largest, having a length of thirty miles and an average width of ten miles. The islands are of volcanic origin and contain a number of active volcanoes, of which Abu, on Great Sangir, is the most important. This volcano was in a state of active eruption in 1856, when 2,850 persons perished. Most of the islands are inhabited and have a fertile soil, producing cocoa palms, fruits, hemp, timber, rice, sago, and tobacco. The area of the group is about 325 square miles, and the population 77,115.

SANHEDRIM (săn-hē'drĭm), a council and tribunal of the Jews. It is thought to date from the time of the Maccabees, and probably was established under John Hyrcanus. Some writers trace its origin to the seventy elders appointed by Moses, but this view is not supported by the early Greek writers. In the later period there were several sanhedrims, of which the Great Sanhedrim was the supreme authority. It was composed of seventy-one priests, scribes, and elders of the people, and under the Romans was presided over by the high priest. The members sat in a crescent, the high priest occupying a seat in the middle higher than the rest. He was supported on the right by the father of the council, called Ab-Beth-Bin, and on the left by a learned referee. It originally had power of life and death, but this it ultimately lost. Herod was summoned before the sanhedrim in 47 B. C. for putting people to death, and Jesus was condemned by it for claiming to be the Messiah. It ended in 425 A. D., when Theodosius put the last president to death. The lesser san-

hedrims or provincial courts, of which there was one in each large town, were composed of twenty-three members appointed by the Great Sanhedrim in the city of Jerusalem.

SANITARY SCIENCE (săn-ĭ-tā′rў), the branch of study relating to the preservation of health and prevention of disease, both as to communities and individuals. This science is not only concerned with the mission of teaching the correct mode of life to individuals, but in an enlarged sense embraces the study of the methods of preventing disease and preserving bodily functions by means of supplying the most serviceable and wholesome dwellings, food, and clothing that may be obtained. It is essential that dwellings and public buildings be constructed in conformity with plans so devised that the most wholesome means of obtaining ample light and ventilation be secured, and that drainage be adequate to the highest needs. With this end in view many cities have placed the supervision of buildings in a state of construction under a competent director, especially with the design that sewerage, drainage, light, and water connections be provided for properly. Within late years growing concern has been manifested in the matter of overcrowded dwellings in cities, in which diseases of an epidemic character often originate, with a view to guard against unwholesome gases generating from the waste of organic and refuse matters.

Legislators, both in the nation and in the states, have directed their attention with a view of providing safeguards against impure and unwholesome food, which in many cases is put on the market to enhance profits, but which result in injury to health and life. As a general rule it is recommended that all dwellings be provided with ample bathing facilities and an adequate supply of pure water, thus enabling the occupants to take such baths as are needed to insure ample cleanliness, and to flush closets for the purpose of removing waste and impurities with speed and effect. Plenty of outdoor exercise is recommended as a prolific source of physical strength. The practice of virtues and freedom from anxiety have a wholesome influence in promoting and preserving health. In Massachusetts, Ohio, and several other states it is necessary to secure the approval of the state board of health of plans for new water-supply and sewer systems. The states give cities general power to regulate the sanitation within their territory. This has resulted in marked improvements in the larger cities, where public supervision is operating to overcome to a large extent the conditions injurious to health.

In 1861 the United States Sanitary Commission was organized by New England women for the relief and comfort of Union soldiers during the Civil War, in the camp and field. This organization was designed to supplement the army medical bureau. It rendered very efficient service in improving the clothing, ventilation, cookery, and drainage. Its work is regarded one of the most perfect exemplifications of charity, and it may be said that much of the suffering and bitterness incident to war were dissipated by the prompt work of the association. Besides distributing many supplies to the soldiers and sailors, it established hospitals and homes at recruiting points, and provided hospital steamers and cars for wounded and sick soldiers. The affairs were managed by a board of twenty-five commissioners, of which Henry Bellows, of New York, was president. The commission received, from its organization to the surrender of its charter, money amounting to about $6,000,000 and goods valued at about $15,000,000, all of which it distributed at points most in need of assistance.

SAN JACINTO (săn ja-sĭn′tō), **Battle of**, the closing battle of the war for the independence of Texas, which took place near the town of San Jacinto, Texas, April 21, 1836. The Texan army of 783 men under General Houston was attacked by 1,536 Mexicans under Santa Anna, and after a desperate struggle of an hour, in which the Mexicans lost about 600 men, the latter surrendered. The independence of Texas was favored by the United States government, and many of Houston's soldiers had been openly enlisted in New Orleans.

SAN JOAQUIN (săn hō-ä-kēn′), a river of California, which rises in the Sierra Nevada Mountains, and after a general course of 350 miles toward the northwest joins the Sacramento at its entrance into Suisun Bay. It receives the water from Tulare Lake by the Kings River. The San Joaquin valley is a large part of the fertile region of central California, and produces vast quantities of cereals, grasses, and fruits.

SAN JOSE (hō-sā′), a city of California, county seat of Santa Clara county, fifty miles southeast of San Francisco. The site of the city is on a plateau between the Coyote and Guadalupe rivers, two small streams flowing into San Francisco Bay, which is about six miles from San Jose. It is a railroad center, has a beautiful climate, and is surrounded by a fertile fruit and farming country. The manufactures include leather, flour, canned fruits, wine, woolen goods, lumber products, and machinery. It is the seat of a United States government building, the state asylum for the insane, a state normal school, and the Academy of Notre Dame. Near it is the Lick Observatory. The city is provided with several excellent parks, electric lights and street railways, pavements, sewerage, waterworks, and several libraries. In 1800 the first settlements were made in the region of San Jose. Population, 1900, 21,500.

SAN JOSE, the capital of Costa Rica,

Central America, situated near the center of the state, on an elevated and fertile plain 3,775 feet above sea-level. It is connected by railway with the coasts of the Caribbean Sea and Pacific Ocean, Limon being the terminus on the former and Punta Arenas on the latter. Its principal buildings include a cathedral, the bishop's palace, the government buildings, and a university. Most of the streets are narrow, but within recent years notable improvements have been made, and its trade has been enlarged materially. The city has a public school system, a medical college, a museum, and a number of parks. San Jose has been the capital of Costa Rica since 1823, in which year it was removed from Cartago. Population, 30,130.

SAN JUAN (hōō-än′), the capital of Porto Rico, situated on a peninsula on the north side of the Gulf of San Juan. It has one of the finest harbors in the West Indies, and is the seat of an extensive trade in native products and imports. Railroad connections afford adequate communication with the interior, and there are many important steamship and submerged telegraph lines. The streets are improved by electric lights, pavements, and rapid transit. Among the manufactures are sugar, tobacco products, clothing, soap, spirituous liquors, utensils, and machinery. It has a number of excellent schools, several public parks, government buildings, a fine cathedral, and a number of other churches. The city was founded in 1521 by Ponce de Leon. It was bombarded by the Dutch in 1625, and in 1898 it became a possession of the United States. San Juan is the largest city of Porto Rico. Population, 1899, 32,048.

SAN JUAN, a river of Central America, which is important because of its location on the route of the Nicaragua Canal. It is the outlet of Lake Nicaragua, flows toward the south and east for about two-thirds of its length, when it makes a bold turn toward the northeast and enters the Caribbean Sea a short distance south of Greytown. Its entire length is about 115 miles; only about one-half of its lower course is serviceable in the canal. In 1529 Diego Machuca sailed down the river from Nicaragua Lake, this being the first time that it was navigated.

SAN LUIS POTOSI (sän lōō-ēs′ pō-tō-sē′), an important railroad city of Mexico, capital of a state of the same name, 360 miles northwest of the city of Mexico. Its site is on a fertile tableland 6,375 feet above sea-level. It has a number of excellent government buildings, and is the seat of a cathedral, a university, and a statue of Plaza Hidalgo. The city is one of the most modern of Mexico, having electric lights, telephones, rapid transit, improved streets, and several libraries. The manufactures embrace cotton and woolen goods, boots and shoes, clothing, lumber products, and machinery. In its vicinity are productive gold and silver mines, and large smelting works are located there. It was founded in 1586, but its prosperity is due largely to the mines and railroad traffic developed in the last century. Population, 64,210.

SANKEY (săŋk′ĭ), **Ira David,** evangelist, born in Edinburg, Penn., Aug. 28, 1840. His father, David Sankey, was an editor and banker, and for many years held the office of state senator. At an early age he displayed much fondness for music. In 1855 he became leader of the Methodist Church choir in Newcastle, Penn., of which he was a member. He attended a convention of the Young Men's Christian Association at Indianapolis, in 1870, where he met Dwight L. Moody, and joined him in his evangelical work. His voice is a fine baritone, for which he became prominent as a valuable auxiliary to the evangelical work of Moody. He published "Sacred Songs and Solos" and "Gospel Hymns."

SAN MARINO (mä-rē′nō), an independent republic in Europe, situated on the eastern slope of the Apennines, about forty miles southeast of Ravenna, Italy. It is entirely encircled by provinces formerly belonging to the papal states but now included in Italy, and occupies an elevated region. Its total area is only thirty-three square miles, and its population 7,875. The climate is healthful, but somewhat windy and subject to frequent rains, and there is a considerable industry in farming, fruit culture, and stock-breeding. San Marino is the capital, and has a population of 4,650. It is reached only by a wagon road and has narrow streets. A museum, several government buildings, and five churches are among the noteworthy structures. The government is by a grand council of sixty members, of whom twenty are nobles, twenty burgesses, and twenty rural land-owners, who are selected by the grand council and serve for life. The executive authority is vested in two captain-regents, who are chosen by the grand council, and each holds office for six months. The army consists of 950 men. San Marino was recognized as an independent republic by the pope in 1631, and ever since its independence has been guarded with remarkable zeal by its inhabitants.

SAN SALVADOR (säl-vä-dōr′), a city of Central America, capital of the republic of Salvador, located 105 miles southeast of Guatemala. It is situated in the center of a rich farming country and has a large inland trade, but its architecture is mostly of wood and brick. The most noted buildings include the national palace, a normal school, a university, a cathedral, and the national theater. Near the city is the extinct volcano of San Salvador, height 8,365 feet. The Spaniards founded the city in 1528. In 1854 it had many splendid buildings, but on April 6 of that year a destructive earthquake completely destroyed it. Soon after it was rebuilt; several of its new

buildings are fine structures. Population, 25,500.

SANSCULOTTE (sănz'ku-lŏt), a word meaning without breeches. It was applied in France by the court party at the outbreak of the Revolution to the advocates of democratic principles. This designation first arose from the circumstance that the Revolutionists adopted the use of trousers or pantaloons instead of the knee-breeches then in fashion, and was applied in a spirit of reproach. The advocates of democracy soon turned the term to good use, applying it to themselves as patriots, and it was long a distinction between them and the court party, but toward the close of the convention fell into disuse.

SANSKRIT (săn'skrĭt), the oldest of the Aryan or Indo-European languages. It bears the same relation to the Aryan languages that Latin does to the Romance languages. Sanskrit is still cultivated as a classical language, and is the sacred language of the Brahmans. There is a resemblance between it and the Greek in that both are highly inflected. However, it holds a higher rank of value to philologists, since philology did not assume the importance of a science until it became known to Europeans. The word Sanskrit is applied only to the symmetrically formed language preserved in the classical and sacred writings of the Hindus, the word meaning carefully constructed. In this sense it stands opposed to Prakrit; that is, natural or common, the Sanskrit dialect spoken by the unlearned people, such as women and servants, in the Sanskrit dramas. The Prakrit is a branch of the southern division of Aryan languages and the source of the vernaculars of modern India. It is thought that the Sanskrit never attained a wide use among the common people, but in its purity constituted the written and spoken form among the educated classes. In the Sanskrit alphabet are fourteen vowels and diphthongs and thirty-three consonants, but to these are added several secondary characters. Among the peculiarities in Sanskrit grammar are its limited use of prepositions to govern nouns, but instead they occur as prefixes of verbs. Three genders are recognized, the masculine, feminine, and common; and three numbers, the singular, dual, and plural. The eight cases include nominative, accusative, instrumental, dative, ablative, locative, genitive, and vocative. Writers recognize a peculiar resemblance between it and the Greek, both languages being highly inflected, and there is a similarity in the forms of the verbs. Two distinct periods are recognized in the history of Sanskrit. The first epoch represents the use of the language as contained in the Vedic hymns, and the other embraces its use in the epic writings, the laws, and other later literature.

Sanskrit literature is made up of a large number of writings, the most important of which are of a religious character. It may be said that the literature begins with the Vedas, and dates probably from 2000 to 1500 B. C. There are four collections of Vedic writings, which are looked upon as the source from which all sacred writings of the Hindus were drawn. The four collections include the large work called "Rig-Veda; the collection of verses known as "Sama-Veda;" the verses or sacrifices known as "Yujur-Veda;" and the addition known as "Atharva-Veda." A later work or treatise relating to religious practice is called "Puranas." The law literature is of next importance, including a treatise on religious and civil law known as "Dharma-Shastra," which embraces additions relating to education, marriage, funeral rites, and the duties of teachers and officers. In the writings classed as epics are a number of interesting works, but the most important include the "Rámáyana" and the "Mahábhárata." The latter is a work of 220,000 lines, and may be said to be the production of writers who flourished in different periods. It contains epic and lyric poems, mythical history, and philosophical investigations. The "Rámáyana" embraces an account of Rama, a prince of Oude, whose heroic conquest of the Deccan and Ceylon is recounted.

The dramatic writings of the Hindus are inferior when considered on a comparative basis with their works in other lines, which is partly due to the use of Prakrit when representing females and the lower characters, while the highest form of Sanskrit is employed in presenting the higher male characters. These writings are rich in fables, among them the earlier collection known as "Panchatantra" and the later group of writings known as "Hitopadesha." Many of these fables became current in the literature of all the Eastern peoples, and even reached a wide use among the people of Europe in the Middle Ages. Their works in history, music, anatomy, medicine, and architecture take a more or less important rank. It is particularly noteworthy that their writings in astronomy and arithmetic are of a high character, and include a treatise on the solar year, which they divided into 365 days. Their astronomer, Aryabhatta, affirmed the revolution of the earth on its axis, gave the true theory of the causes of solar and lunar eclipses, and observed the motion of the equinoxes and solstices. In lexicography they had a number of works that embrace commentaries on words and trace many of them from their roots. Precision of language was a peculiar characteristic of their writers, which is evidenced by numerous works on grammar and prosody. The oldest work on Sanskrit grammar dates from the 3d century B. C., and is assigned to a writer named Panini. Many literary productions and treatises in the Sanskrit emanated from Buddhist and Brahman writers of recent date, though these

writers employed modern forms of the language. It is made certain by inscriptions that Sanskrit in its purity ceased to be a spoken tongue at least 200 years before the Christian era.

SANTA ANA (sän'tä ä'nä), a city of Central America, in Salvador, near the Santa Ana River, and capital of the department of Santa Ana. It has railroad connection with Acajutla, its seaport on the Pacific Ocean. The surrounding country is fertile, yielding cereals, grasses, vegetables, and fruits. Santa Ana is one of the most important cities of Salvador. In its vicinity are silver, copper, iron, and zinc mines. It has an important trade in sugar, cereals, and fruits. The city has many excellent buildings, several schools, and the national university. The volcano of Santa Ana is ten miles southwest of the city; height 6,625 feet. Population, 22,350.

SANTA ANNA, Antonio Lopez de, soldier and statesman, born in Jalapa, Mexico, Feb. 21, 1795; died June 20, 1876. He entered the Spanish army in 1810, and by 1821 attained the rank of lieutenant-colonel, but in the same year he joined the revolutionary forces under General Iturbide, who made him governor of Vera Cruz with the military rank of brigadier-general. The Spanish forces were driven from his territory, and when Emperor Iturbide's government became oppressive, in 1822, he declared a republic, which every government except Spain recognized. The aristocratic faction incited a number of quarrels that led to civil war, but Santa Anna not only quelled the disturbances with vigor, but defeated a body of Spanish soldiers at Tampico, and in 1832 became president of the republic. His government adopted the policy of concentrating power in the nation at the expense of the states, making the latter largely tributary, and in consequence Texas rebelled in 1836. Though at first highly successful in the war against Texas, he was finally defeated at San Jacinto by General Houston and made prisoner. Soon after his release Mexico was invaded by French troops, who landed at Vera Cruz in 1837, but Santa Anna charged them with great bravery and drove the invaders from Mexican territory. He was wounded in the left leg at Vera Cruz, which made it necessary to amputate the limb. In 1841 another revolution occurred, and he was appointed by the junta provisional president, serving in that capacity until 1845, when he was obliged to seek safety at Havana as an exile.

SANTA ANNA.

The war with the United States began in 1846. After the defeat of the Mexicans at Palo Alto, Resaca de la Palma, and Monterey, Santa Anna was recalled to take charge of the army and was made president. Soon after the defeat of Buena Vista and Cerro Gordo it became certain that the capital would be taken and Santa Anna resigned the presidency and retired from Mexico. He was recalled in 1853 and made president, but was compelled to leave two years later, and when Maximilian became emperor he returned under a written promise of loyalty to the empire. His intrigues to arouse the people against the government caused the emperor to order him from the country, when he took up his residence in the United States, but returned to Mexico in 1867 to make his final effort to secure control of the government. However, he was captured before landing at Vera Cruz and condemned to death, but President Juarez pardoned him on condition that he would leave the country. His residence was on Staten Island, New York, till 1875, when he returned to his native country. Santa Anna is regarded one of the ablest of Mexican generals, and quelled civil wars with considerable success. Charles III. of Spain conferred upon him the Grand Cross, and the king of Prussia presented him the Cross of the Red Eagle.

SANTA BARBARA (săn'ta bär'ba-ra), a city in California, county seat of Santa Barbara county, on the Pacific coast, ninety miles northwest of Los Angeles. It has a good harbor, convenient railroad facilities, and is surrounded by a country producing wool, live-stock, petroleum, and fruits. The city has fine public schools and several institutions of higher learning. Among the manufactures are flour, beet sugar, canned fruits, earthenware, and machinery. It is lighted by gas and electricity, has street pavements, waterworks, and other municipal facilities. A mission was founded on the site of Santa Barbara in 1780. Population, 1900, 6,587.

SANTA CLAUS, the name of a friend of children, who, according to folk-lore, brings presents on Christmas eve. He is usually represented as an aged but jolly man who drives over the roofs in a sleigh drawn by reindeer, and descends chimneys to fill with gifts the stockings hung up to receive them. It is said that he sometimes leaves a birch rod in the stocking of a naughty child. The name Santa Claus was derived from St. Nicholas, the patron saint of children, and is of German origin, but the legend was first brought to America by Dutch settlers of New York. The feast was celebrated originally on Dec. 6, and that day is still observed in some parts of Germany, but it is now held generally on Christmas.

SANTA CRUZ (krōōs), county seat of Santa Cruz county, California, on Monterey

Bay, seventy miles southeast of San Francisco. It has steamboat and railroad connections with San Francisco, and many excellent accommodations for the care of visitors, who find it an agreeable watering place. The surrounding country is noted for its production of cereals, live-stock, and fruits. In the vicinity are deposits of bitumen. The manufactures are leather, paper, flour, lime, lumber products, and machinery. Santa Cruz has excellent school and church buildings. Electric lights, telephones, and pavements are among the improvements. Population, 1900, 5,659.

SANTA CRUZ, the capital and chief port of the Canary Islands, on the northeast coast of Teneriffe. Its harbor is the best in the Canary group, being protected by two moles, and there is safe anchorage for a large number of ships. The streets are broad and regularly platted, but most of the buildings have flat roofs. It has a large import and export trade, and manufactures of wine, cochineal, and utensils. The city is defended by several forts. Population, 15,375.

SANTA CRUZ, a city of Bolivia, capital of the department of Santa Cruz, about 110 miles northeast of Sucre. It is situated in the valley of the Mamore River, and is surrounded by a fertile country. In its vicinity are vast forests. Many of the buildings are of timber, but some are of stone and brick. It has a growing inland trade. Population, 14,650.

SANTA FE (fā'), capital of New Mexico, in Santa Fe county, on the western slopes of the Rocky Mountains, about twenty miles east of the Rio Grande River. It occupies a fine site 6,825 feet above sea-level, within sight of the foothills of the Rocky Mountains, and has convenient railroad facilities. The former town of low houses and narrow streets has given way to a new city with modern facilities. It has an extensive and growing trade, and in its vicinity are valuable mines of gold, silver, zinc, lead, and copper. The climate is arid, thus making irrigation necessary for successful cultivation, but this means has been taken advantage of and many fine farms, orchards, and gardens are the result. The city has a fine public school system and is the seat of a Presbyterian Academy, the University of New Mexico, St. Michael's College, and the Romona School for Indian Girls. It is provided with waterworks, electric lights, several libraries, and other facilities. Santa Fe was first visited by the Spaniards in 1542, when it existed as an Indian town. It was founded in 1605, and is one of the oldest cities in America. It became the capital of New Mexico in 1640, but was captured and burned by the Indians in 1680 and was recaptured in 1694. An American army under General Kearney occupied it in 1846. It was held by the Confederates for a short time in 1862. Population, 1900, 5,603.

SANTA FE, a city of Argentina, capital of the province of Santa Fe, 230 miles northwest of Buenos Ayres. It occupies a low site at the junction of the Salado and Parana rivers. The surrounding country produces fruits and cereals. It has an important railroad and river trade in timber, hides, and cereals. Among the manufactures are tile, macaroni, oil, clothing, and machinery. It has a Catholic cathedral, a Jesuits' college, and several schools, and is the seat of a bishopric. Population, 23,125.

SANTA MAURA. See **Leucadia.**

SANTANDER (sän-tän-dār'), a seaport city of northern Spain, capital of the Santander province, on the Bay of Biscay. It has an excellent harbor, extensive steamboat and railroad facilities, and enjoys a considerable trade in cereals, fruits, live-stock, and merchandise. Among the manufactures are sailcloth, chemicals, tobacco products, cured fish, leather, sugar, clothing, and machinery. The city is well built and is improved by numerous municipal facilities. It has waterworks, electric lighting, a cathedral, several parks, and a number of schools. Population, 43,330.

SANTA ROSA (rō'zä), a city in California, county seat of Sonoma county, fifty miles north of San Francisco, with which it is connected by railways. The surrounding country produces large quantities of fruits, cereals, and dairy products. Electric lights, pavements, waterworks, and telephones are among the facilities. The manufactures include wine, leather, canned fruit, cigars, flour, and machinery. It is the seat of the Pacific Methodist College and Christian College, and has fine school and church buildings. Population, 1900, 6,673.

SANTIAGO (sän-tē-ä'gō), the capital and largest city of Chile, in the Santiago province, ninety miles southeast of Valparaiso. It occupies a site on the Mapocho River, which is elevated about 1,650 feet above sea-level, but its buildings are mostly low, owing to occasional disturbances by earthquakes. The streets are regularly platted, intersecting each other at right angles, and in its center is the Plaza Independencia, a large square adorned with beautiful plants and a fine fountain. Around the square are the most important buildings, including a cathedral, the government building, and an archbishop's palace. Other structures of note are a mint, the University of Santiago, the national institute of secondary education, a musical conservatory, and a military school. The university has a fine museum, a library, and botanical gardens. It is attended by 1,000 students. The national library, founded in 1813, contains 75,000 volumes, among them many valuable works relating to America. Santiago has an extensive public school system, numerous churches, academies, convents, and several scientific and educational associations. The surrounding country is noted for its splendid orchards of figs and other fruits, and con-

tains productive deposits of gold, silver, lead, and other minerals. Among the manufactures are wines, clothing, earthenware, furniture, machinery, and tobacco products. The city has railroad connections with other trade emporiums. It is lighted by gas and electricity, and has street railways, waterworks, pavements, sewerage, telephones, telegraphs, and numerous periodicals. Pedro de Valdivia founded Santiago in 1541. Population, 291,540.

SANTIAGO DE CUBA (kōō'bä), an important seaport city of Cuba, on the Bay of Santiago de Cuba, in the southeastern part of the island. It has excellent steamboat and railroad facilities and a well-defended harbor, which is accessible by the largest vessels. The city occupies a fine site on a hillside 150 feet above the bay. It has paved streets, electric lights, waterworks, rapid transit, and other municipal improvements. Its most important buildings include a number of government structures, an excellent cathedral, a custom-house, several hospitals, many public schools, and a number of churches. Among the manufactures are sugar, soap, leather, tobacco and cigars, spirituous liquors, lumber products, and machinery. In the vicinity are extensive copper mines and numerous orchards, vineyards, and tobacco and sugar plantations. The city was founded in 1514, and is the oldest town of Cuba. It was for many years the capital city. On July 3, 1898, the American fleet destroyed the Spanish squadron near Santiago, and the city capitulated and was occupied by American troops on July 17 of the same year. Population, 1900, 43,090.

SAO FRANCISCO (sown frön-sēs'kō), a river of eastern Brazil, which rises in the province of Minas Geraes. It has a general northeasterly course to Quebrobo, where it assumes a course toward the southeast and flows into the Atlantic. It courses through a large part of the Brazilian highlands, and in its upper regions are the celebrated Brazilian diamond fields. Its entire length is 1,750 miles, and it is navigable for large vessels to the Falls of Paulo Affonso, a distance of 140 miles from its mouth. These falls are 275 feet high, and may be classed among the most remarkable of America. The river is navigable for 900 miles above the falls.

SAO PAULO (sown pow'lō), an important commercial and railroad city of Brazil, capital of a state of the same name, 250 miles southwest of Rio de Janeiro. It occupies a fine site on a plain near the source of the Rio Tiete River, a tributary of the Rio Paranahipa. The surrounding country is noted for its fertility, and has excellent forests and deposits of precious metals and gems. It has a large trade in coffee, livestock, tobacco, sugar, rice, millet, and dairy products. The manufactures include furniture, cotton and woolen goods, leather, vehicles, soap, utensils, and machinery. Among the important buildings is a cathedral, many other churches, a Jesuit college, several schools and academies, and valuable government buildings. The state of Sao Paulo is colonized largely by Europeans, including many Germans and Italians. The city was founded by Jesuits in 1552. Population, 76,520.

SAP, the liquid contents of plants, which serves functions in plant life as important as blood does in animals. In it take place the changes necessary for vegetable growth. It is formed by the roots as crude sap from materials taken up from the soil. After passing from cell to cell by a process known as endosmose, it ascends to the leaves. There it undergoes chemical changes through the influence of light, especially the absorption of carbon dioxide from the air and the formation of sap elements. It now takes the name of elaborated sap, and descends mainly through the bark, forming on its downward course the new growth to build up the plant. The ascent is with great rapidity in a zigzag course, but it is most copious in the spring, while at the beginning of winter it ceases entirely. The movement of sap in trees is one of the early signs of the return of spring in temperate and cold zones.

SAPPHIRE (săf'īr), a precious stone of the corundum kind, next in value and hardness to the diamond. The ruby is a reddish-colored stone of the same kind, while the sapphire is a transparent species of a blue color, but there are sapphires of variegated colors. The topaz is a yellow sapphire; the amethyst is a violet; the emerald is a green; and there are colorless, striped, and milky varieties. Sapphire occurs crystallized in six-sided prisms, with six-sided pyramidal ends. The most valuable specimens are produced in Ceylon, Bohemia, Burmah, and Persia. Several species are obtained in the United States, Germany, and Australia. The value of sapphires depends upon color and transparency.

SAPPHO (săf'o), eminent Greek poetess, born at Mitylene, on the island of Lesbos, and lived about 600 B. C. Few events of her life have passed down in history, but it is generally thought that her father died when she was six years old. Grecian literature makes it certain that she lived at the same time that Alcæus, Pittacus, and Stesichorus flourished. She resided as a refugee in Sicily from 604 to 592 B. C., where she practiced the art of poetry and attracted the attention of many female pupils. After returning to Mitylene, she became the

SAPPHO.

center of a coterie made up of females who had been her students in fashion and poetry. Her writings consist chiefly of songs of love, and she is placed by Aristotle in the same rank with Homer. Plato spoke of her as the tenth Muse, and it is said that one of her poems so affected Solon that he prayed the gods to preserve his life till he had found time to commit it to memory. Her writings were intended to elevate her country-women, and all of them were remarkable for their intense and brilliant style and beauty of imagery. Only two of her odes are extant, one of which is a beautiful poem devoted to Venus, the goddess of love and beauty.

SARACEN (săr'ā-sĕn), a word meaning Oriental or Eastern. It was first applied by Pliny to the Bedouin Arabs inhabiting Mesopotamia. Later it became gradually extended in meaning to include the inhabitants of the Syro-Arabian desert, who harassed the frontiers of the Roman Empire, and still later to any Mohammedan enemy of the Christians. In the latter sense it was applied to those who embraced the doctrine of Mohammed and held it to be their duty to spread the Moslem faith everywhere, which in fact meant to conquer the whole world. To accomplish this purpose they resisted the Crusades and made many invasions of Europe, giving men the choice of three things—the Koran, tribute, or the sword. The Saracens originated a style of architecture peculiar to themselves, of which representative specimens are still abundant in southern Europe. It is spoken of generally as Arabian architecture in Asia and Egypt, and as Moorish in Spain. The most excellent specimen of Saracenic architecture in Asia is found in the public buildings erected in Persia by Shah Abbas, in the early part of the 17th century. These include the magnificent mosque known as Mesjid Shah, a structure 223 feet long and 130 feet wide. It is crowned by a double dome 165 feet high. The most excellent specimen in Africa is the beautiful mosque built by Ibn Tooloon in 876 A. D., at Cairo, Egypt. Another fine specimen near Cairo is the mosque and tomb of Kaid Bey, completed in 1463. See **Moors.**

SARAGOSSA (săr'ā-gŏs-ä), a city of Spain, capital of the Saragossa province, on the Ebro River, 175 miles northeast of Madrid. It has ample railroad facilities, and is important as a trade and manufacturing center. The city is divided into two parts by the river, which is crossed by an excellent bridge dating from 1437. Most of the streets are narrow and tortuous, and many of the buildings are low, but there are a number of excellent structures of historic interest. Among them are two excellent cathedrals, known as El Pilar and La Seo, the former dating from 1677 and the latter, a Gothic structure, was completed in the 13th century. Its university was founded in 1474, and was once an institution of wide fame. At present it has 800 students and a library of 20,000 volumes. Other noted institutions are several hospitals, a museum, a town-house, and an exchange. The Moorish citadel, called the Aljaferia, formerly served as a palace for the kings of Aragon, but later became connected with the Inquisition. The city has manufactures of leather, silk and cotton textiles, utensils, vehicles, cigars, and clothing. It is an attraction for pilgrims from many parts of the Spanish world, who go there to witness the image of the Virgin, a fine figure in one of the cathedrals. Saragossa is an ancient city, dating from a remote period. Its present name was applied in honor of Cæsar Augustus in 25 B. C. The Romans made it an important trade center, but it fell under the Moors in the 8th century. Alfonso of Aragon captured it in 1118, after which it remained the capital of the kingdom of Aragon for some time. The French besieged it in 1808-09, during which time many perished. It was then that a woman named Augustina snatched the match from the hands of a dying cannoneer and fired his cannon at the enemy. She has come to be called the "Maid of Saragossa," and her fame has been recorded in the writings of Southey and Byron. The city has a population of 93,440.

SARATOGA (săr-ą-tō'gą), **Battle of,** an important engagement of the American Revolution. It occurred near Saratoga Springs, New York, on Oct. 7, 1777, and is classed by Creasy as one of the "Fifteen Decisive Battles of the World." The continental army had been victorious at Bennington and was daily increasing in strength, while the British under Burgoyne were awaiting help from General Howe. General Gates held a strong position at Bemis' Heights, which Burgoyne decided to storm, but in this he was thwarted by the prompt and vigorous action of Benedict Arnold, who led a furious opposition with 3,000 men. The battle ended at dark without decisive results, and on the 9th Burgoyne fell back to Saratoga, where his supplies were cut off and he was besieged by the Continentals under General Gates. After several light skirmishes, Burgoyne decided to surrender, which he did on the 17th, with the understanding that he and his men were not to serve against the Americans again. The men surrendered numbered 5,804, and 4,650 muskets and forty-two guns were captured. A beautiful obelisk 155 feet high is located twelve miles east of Saratoga Springs, on a bluff near the Hudson, which was the scene of the principal engagement.

SARATOGA SPRINGS, a city of New York, in Saratoga county, forty miles north of Albany. It is one of the most noted watering places of the United States. In its vicinity are many mineral springs. Fashionable and convenient cottages and hotels are abundant. The prevailing character of the water is cathartic, and it is bottled and shipped in large quantities. The city has ample railroad conveniences, electric lights,

street railways, and several parks. It is a very beautiful and pleasant place. About five miles from the city is Saratoga Lake, to which an electric railroad extends. Excellent public schools and churches, modern municipal facilities, and a fine courthouse are among the improvements. The manufactures include clothing, machinery, cigars, and earthenware. It has a growing trade in fruits and merchandise. Population, 1900, 12,419.

SARATOV (sä-rä-tŏf'), or **Saratoff**, a city of Russia, capital of the government of Saratov, on the Volga River, 460 miles southeast of Moscow. It is an important commercial and manufacturing center, has important steamboat and railroad facilities, and is surrounded by a fertile farming and fruit-growing country. The site of the city is on the east side of the Volga, where it stretches over a rolling tract of land. Its streets are improved by excellent pavements, gas and electric lighting, rapid transit, waterworks, and beautiful gardens and parks. Among the principal buildings are two cathedrals, a museum, the government buildings, and several excellent high schools, colleges, and hospitals. The manufactures embrace woolen textiles, cotton and silk goods, cordage, pottery, tobacco products, furniture, chemicals, leather, clothing, and machinery. The exports consist principally of corn, tobacco, hemp, flax, and live-stock. Population, 123,980.

SARCOPHAGUS (sär-kŏf'ā-gŭs), a stone coffin or tomb, employed to enclose a dead body. The wealthy classes of Egypt were the first to use sarcophagi, but later the practice extended to the inhabitants of the region of Asia bordering on the Mediterranean Sea, particularly to the Phœnicians, Carthaginians, Persians, Grecians, and Romans. Many of them were decorated and ornamented with elaborate carvings and inscriptions. The most beautiful specimens were found in the Egyptian pyramids. Coffins of stone have been used to some extent for royal or distinguished persons even in modern times.

SARDANAPALUS (sär-dą-ną-pā'lŭs), the Greek name of a number of kings of Assyria, one of whom was the last king of the Assyrian empire of Nineveh. The Greek writer Ctesias described him in terms that have made his name proverbial as the type of luxury. His oppression led a Median satrap named Arbaces to join a native revolution against him in 785 B. C. This resulted in his army being defeated and withdrawn into Nineveh, where he was besieged for two years. When it became apparent that resistance was in vain, he gathered his vast treasures in his palace and set them on fire, both he and his numerous wives perishing in the flames. It is thought by some writers that the account given by Ctesias is not historical, and that the name is a corruption of Assurbanipal.

SARDINE (sär'dēn), a class of small fishes, belonging to the same genus as the herring and the pilchard, much valued as food. They are mostly canned in oil. This is done after salting and partly drying by pouring hot olive oil, or oil and butter, over them and sealing in a tin can. The young of the herring and menhaden are preserved in the same way in the United States. Sardines are abundant in the Mediterranean and off the western coast of Europe, where they are caught and canned in large quantities. Anchovied sardines are those preserved in red wine.

SARDINIA (sär-dĭn'ĭ-a), an island in the Mediterranean, lying south of Corsica. Next to Sicily it is the largest of the Mediterranean islands. It is separated from Corsica by the Strait of Bonifacio, a channel about seven miles wide, and its shores are indented by numerous gulfs, among them the gulfs of Asinara, Oristano, Palmas, Cagliari, and Orosei. The island is 155 miles long from north to south; width, about seventy miles, and area, 9,350 square miles. Several mountain groups characterize different parts of the island. The most elevated peaks are in the eastern part. Many of them are chiefly of granite formations. Mount Gennargentu, height 6,225 feet, is one of the highest peaks. The coasts are generally steep and rugged, and near the shore are a number of small islands; most of them are off the north and west coasts. Sardinia has an abundance of drainage, the most important rivers including the Coghins, flowing into the Gulf of Asinara in the north; the Tirso, flowing into the Gulf of Oristano in the west; and the Flumendosa, flowing into the Mediterranean on the east.

The climate of Sardinia is mild, with a temperature ranging from 30° to 90°, and there is an amplitude of rainfall. Both the climate and rainfall vary somewhat on account of elevation, but it may be said that the most pleasant weather is experienced in autumn. The soil is generally fertile, especially in the valleys and coast regions, and there are an abundance of timber, fine fisheries, and valuable deposits of minerals. Among the mineral productions are sulphates of iron and copper, arsenic, nickel, cobalt, silver, zinc, antimony, lead, quicksilver, granite, and limestone. Agriculture is the principal occupation, though mining, manufacturing, and fishing have been developed considerably. The principal soil products include maize, wheat, beans, barley, tobacco, hemp, vegetables, flax, oranges, lemons, and many other fruits. The fisheries yield sardines, tunny, anchovies, and coral; and the live-stock embraces cattle, horses, sheep, goats, and swine. Among the manufactures are cotton textiles, silk and woolen fabrics, clothing, hardware, machinery, furniture, and cured fish. Several railroad lines penetrate different parts of the island, the most

important being the line built from the Gulf of Asinara to the Gulf of Cagliari, which touches the coast of the Gulf of Oristano. Cagliari, on the Gulf of Cagliari, is the capital and principal seaport. It has an important interior and foreign trade, numerous fine buildings, and a population of 37,320.

The early history of Sardinia is wrapped in tradition, but it is reasonably certain that a high state of civilization was developed at the time of the greatest prosperity of Greece. It was known to the Greeks as Ichnusa. The Carthaginians conquered it about 480 B. C., and during their occupancy it became noted for its production of corn and fruits. It was made a Roman possession in 238 B. C., and was long noted as the granary of Rome. The Vandals, Goths, and Saracens successively conquered it after the fall of the Roman Empire, but the Eastern Empire recovered it in 534 A. D. Saracen invaders obtained a foothold a second time, but they were driven out by an allied army from Genoa and Pisa in 1299. The conquerors divided the island as two separate possessions. Shortly after it became a territory of the kings of Aragon, and remained tributary to Spain until taken by the British in 1708, but it soon after fell to Austria under the treaty of Utrecht, and in 1720 became a part of the kingdom of Sardinia under the house Savoy.

The history of Sardinia is merged into that of Italy from the ascension of Victor Emmanuel II. to the throne of United Italy. It is now divided into the provinces of Sassari and Cagliari. The people are a mixture of Italian and Spanish stock, and somewhat resemble the Greeks. They are in a very backward state educationally. Fully eighty per cent. are unable to read or write, and public education may be said to be in a primitive condition. The family feud or vendetta is still practiced, but to a more limited extent than in Corsica. Universities are maintained in Cagliari and Sassari, and elementary schools and convents prevail in the smaller towns. The religion is almost exclusively Roman Catholic. The principal cities include Cagliari, Sassari, Tempio, Alghero, and Oristano. Population, 733,344.

SARDINIA, Kingdom of, formerly a kingdom of Europe, situated in the southern part of the continent. It was formed principally of the duchies of Savoy and Genoa, parts of Milan and Montferrat, the county of Nice, the principality of Piedmont, and the islands of Caprera and Sardinia. It had an area of 28,769 square miles and a population of 5,167,542. Victor Amadeus II., duke of Savoy, in 1720 assumed the title of king of Sardinia. This he did in accordance with a treaty with Austria, whose terms provided that he was to surrender Sicily and receive in exchange the island of Sardinia. The history of the kingdom is largely wrapped in the fortunes of war with Austria and other countries, and is important as bearing upon and forming the nucleus of the present kingdom of Italy. The last war of the kingdom was under Victor Emmanuel II., who formed an alliance with France against Austria in 1859. In 1861 he came into possession of all of Italy, except Rome and Venetia, and assumed the title of king of Italy instead of king of Sardinia. He added Venetia to the kingdom in 1866, and completed the union of Italy by annexing the papal states in 1870.

SARDIS (sär'dĭs), or **Sardes,** the name of an ancient city in Asia Minor, capital of Lydia, on the Pactolus River, about forty-five miles east of Smyrna. The Greek writer Æschylus made the first mention of the city, and it was captured by the Cimmerians about 650 B. C. Its greatest prosperity was reached in the reign of Crœsus, who became its king about 568 B. C., when it was in possession of fabulous wealth and power. The importance of Sardis was due to its military strength, the fertility of the surrounding country, and its location on the highway leading from the interior of Asia to the Ægean coast. The Athenians burned it in 503 B. C., and after the Roman conquest it was made a provincial government. Sardis is mentioned in the Book of Revelation. In profane history it is spoken of as the residence of both Xerxes and Cyrus the Great. Timour conquered it in 1402, when much of it was destroyed. Its site is at present occupied by a dilapidated village called Sart.

SARDOU (sar-doo'), **Victorien,** dramatist, born at Paris, France, Sept. 7, 1831. He descended from a family in humble circumstances, and after studying medicine for some time, engaged in literary work, producing his first comedy in 1854. This proved a failure, but he continued industriously at work and finally attained recognition by various dramatic compositions. His plays attracted the favorable notice of Sarah Bernhardt, who made them popular at several leading theaters, both in France and the United States. He was decorated with the Legion of Honor in 1863, and became a member of the French Academy in 1877. His comedies are emotional and for the most part improbable, but they are full of witty dialogue and are calculated for rapid action. Among his most noted productions are "Uncle Sam," a satire on American society; "Daniel Rochat;" "Scrap of Paper;" "Woman of Silence;" "Dora," and "Diplomacy." He wrote three plays for Sarah Bernhardt, entitled "Theodora;" "Fedora," and "La Tosca."

SARGENT (sär'jent), **Epes,** journalist and poet, born in Gloucester, Mass., Sept. 27, 1813; died Dec. 31, 1880. He studied in the schools of Boston and at Harvard University, and subsequently engaged as editor and publisher of the "Boston Daily Advertiser." In 1839 he took an editorial position with the "New York Mirror," and afterward

served in a similar position on the "Boston Evening Transcript." Later he retired from newspaper work to engage as editor of a series of school books, and wrote a number of biographies, poems, and dramas. His best biography is "Life of Henry Clay;" his best known song, "Life on the Ocean Wave," and his most popular drama, "Bride of Genoa." "Song of the Sea" is a favorite poetic production.

SARGON. See **Assyria.**

SARMATIANS (sär-mā'shans), a powerful race of nomadic people of Europe and Asia, who occupied the vast region lying in the vicinity of the Caspian, Black, and Baltic seas in the time of the Romans. It is thought that they were of Asiatic origin, and tradition makes them the descendants of the Amazons by fathers of Scythian birth. Their women became famous as warriors, and as such entered the campaign on horseback with lance and spear. At first composed of various tribes, they became amalgamated into a powerful nation, and in the 4th century B. C. made the Scythians tributary. No barbarian people were more formidable in harassing the Roman frontiers than they. It is probable that they were conquered by the Goths in the 4th century A. D. Much of the history of Sarmatia was recorded by Ptolemy, but the manner in which he speaks of the Slavs, Finns, Goths, and other peoples of a barbarian nature makes it certain that he applied the term quite loosely.

SARSAPARILLA (sär-sà-pà-rĭl'là), the dried root or root-stalk of the smilax, a genus of shrubby climbing plants native to tropical America. The plants grow only in the pres-

SARSAPARILLA.
Leaves and Fruit.

ence of abundant moisture, developing roots many feet long but remarkably slender. They are sold in the market as drugs, and are used in the preparation of medicine. The drug is sold largely as a purifier of the blood, but its value for that purpose is overestimated.

SARTO (sar'to), **Andrea del,** eminent Florentine painter, born in Florence, Italy, in 1487; died there, Jan. 22, 1531. He was the son of a tailor named Vannucchi, but was named Del Sarto, meaning the tailor's son. After studying as a pupil of Pietro di Cosimo, he became inspired with a love for fresco painting, which line includes his greatest achievements. Francis I. invited him to Paris in 1518, where he painted many excellent works, among them "Charity," now in the Louvre. After returning to Florence, he devoted himself to sacred subjects. The most noted of his works are "Sacrifice of Abram," now in Dresden; "Madonna with Saints," in the Berlin Museum; "Last Supper;" "Contending Theologians," and a series of frescoes from the life of John the Baptist.

SASKATCHEWAN (săs-kăch'ę-wan), a river of Canada, which rises in the Rocky Mountains by two sources called the North and the South Saskatchewan. The two branches unite some distance below Prince Albert, in Saskatchewan, and flow east into Lake Winnipeg. The north branch is 815 miles long and the south branch 775 miles. From their confluence to Lake Winnipeg the distance is 280 miles. The Saskatchewan passes through Cedar Lake. Its valley is a fertile region, and contains extensive and valuable forests and vast deposits of salt, iron, coal, and other minerals. About 1,000 miles of navigable waterway is afforded, and in the upper course are ample opportunities for utilizing water power. The river is frozen from the middle of November to the middle of April.

SASKATCHEWAN, an extensive district of Canada, bounded on the north by Athabasca, east by Keewatin and Manitoba, south by Manitoba and Assiniboia, and west by Alberta. Its length from east to west is about 450 miles, width 225 miles, and area 114,000 square miles. The surface is diversified, but may be said to be generally of an undulating character, and includes the principal part of the great valley of the Saskatchewan River. Other rivers are the North and South Saskatchewan, Battle, Beaver, and Grass rivers, all having a general northeasterly course. There is a considerable lake surface, including Cedar and La Ronge Lakes, and parts of Winnipeg and Winnipegosis. The region has an abundance of valuable forests, including all the hardy northern varieties. It has deposits of coal, iron, limestone, and other materials. Lumbering, fishing, stock-raising, hunting, and agriculture are the principal occupations. Railroad building has received marked attention within recent years, and many towns have been founded in consequence of providing means of interior commerce. It has public schools, a postal system, and a large telephone and telegraph mileage. Battleford, on the North Saskatchewan, is the capital. Prince Albert, on the same River, is the largest city. It has excellent railroad connections and a large trade. The district has a population of 22,375.

SASSAFRAS (săs'sà-frăs), an extensive genus of plants, several of whose species

are noted for the medicinal virtues of their roots. The plants containing medicinal properties are trees or shrubs widely distributed in North America from Canada to the Gulf, and range in size from a large tree fifty feet in height to a small bush in the cold regions. They have yellow flowers, bear dark-blue fruit, and the root yields the oil of sassafras. The chips are used in preparing a light drink known as sassafras tea. Allied species are found quite extensively in various countries as the sassafras-nut tree of Brazil, the plume-nutmeg tree of Australia, the laurel tree of New Zealand, and the laurel of California.

SATELLITE (săt'ĕl-līt), a celestial body attending upon and revolving around some planet. It is often spoken of as a secondary planet, while the body around which it revolves is called a primary planet. The earth's satellite is called the moon. It has been ascertained that the eclipses, inclinations, inequalities, and reciprocal attractions of the satellites of all the planets more or less distinctly correspond with that of the moon. While the earth has but one satellite, other planets have a larger number, but some of the planets are not attended by any. Neptune is accompanied by one; Mars by two; Uranus by four; Jupiter by five; and Saturn by eight. It is supposed that Saturn's rings are composed of a multitude of satellites. The following table gives the more interesting facts in relation to the different satellites, but several of those referred to, as the unnamed satellite of Jupiter, have not been generally admitted:

Name of Satellite.	Planet.	Year Discovered.	Diameter in Miles.	Distance from Planet.
Moon	Earth	.....	2,160	238,818
Phobos	Mars	1877	7	5,900
Deimos	Mars	1877	5	14,600
Io	Jupiter	1610	2,352	261,000
Europa	Jupiter	1610	2,099	415,000
Ganymede	Jupiter	1610	3,436	664,000
Callisto	Jupiter	1610	2,929	1,167,000
Unnamed	Jupiter	1892	100	.....
Mimas	Saturn	1789	600	117,000
Enceladus	Saturn	1789	800	157,000
Tethys	Saturn	1684	1,100	186,000
Dione	Saturn	1684	1,200	238,000
Rhea	Saturn	1672	1,500	332,000
Titan	Saturn	1655	3,500	771,000
Hyperion	Saturn	1848	500	934,000
Ipatus	Saturn	1674	2,000	2,225,000
Phœba	Saturn	1898	.....	.....
Ariel	Uranus	1854	500	120,000
Umbriel	Uranus	1851	400	167,000
Titania	Uranus	1787	1,000	273,000
Oberon	Uranus	1787	800	365,000
Unnamed	Neptune	1846	2,000	225,000

SATIN, a silk fabric of a close texture, made with an overshot woof and a glossy surface. The warp forms have a close and smooth surface, and, to obtain its luster, it is passed between heated cylinders. An interval of fifteen threads occurs in a full satin twill.

SATINWOOD, an ornamental wood obtained in the West and East Indies. It is one of the most highly prized light woods for

SASSAFRAS.
Leaves and Fruit.

cabinet work. The best grades that come from the West Indies are lighter in color than those produced in the Asiatic islands, and are considered the most valuable. Several species of trees yield satinwood; the finest products secured in the West Indies are from the prickly ash, called Bahama satinwood. Satinwood has a close grain and is hard and durable. It is capable of taking a fine polish, and is exported largely for furniture. In India it is used for building purposes, especially for floors in dwellings.

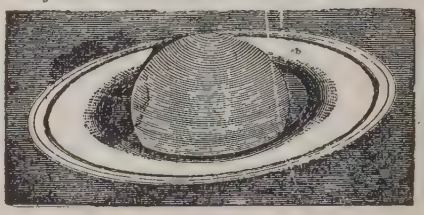
SATIRE (săt'īr), the employment of sarcasm, irony, or keen wit in attacking individuals, manners, or social or political movements. The Romans were the first to employ satire in holding wickedness and folly up to public ridicule and censure. Lucilius and Horace are generally regarded the originators of satire, and toward the end of the republic it was used both in prose and verse. Lowell is the great master of satire in America. The leading English satirists are Byron, Pope, and Dryden; and the leading German, Goethe and Wieland. The sting of satirical writings lies in the discovery between the man spoken of as he appears to himself, and the man as he appears to others.

SATOLLI, Francis, prelate and diplomat of the pope of Rome, born in Perugia, Italy, in 1841. After studying in the seminary of his native city under Joachim Pecci and Pope Leo XIII., he became chief assistant of that pontiff in promoting theological studies. Later he was made professor in the Roman Seminary, but soon became archbishop of Lepanto. In 1889 he was sent as a representative of the pope to Baltimore, Maryland, where the centenary of the Roman Catholic hierarchy was celebrated, and he also rep-

resented the Holy See at the inauguration of the Catholic University in Washington, D. C. In 1893 he became apostolic delegate to the Roman Catholic Church in the United States. This appointment gave the church in America a form of autonomy, his power including the exercise of pontifical jurisdiction, limited only by appeal to the pope. In 1896 he was made cardinal, being succeeded in the same year in the office of delegate by Sebastian Martinelli. He is the author of several works on theology and philosophy, among them "Course of Philosophy."

SATURN (săt'ŭrn), a deity of ancient Italy. He is generally regarded by the Romans and modern writers as identical with Cronus, the god of time, in its sense of eternal duration, and of agriculture. He is represented as having married Rhea, daughter of Uranus and Gaea. His uneasy conscience made him fear that his children might some day rise up against his authority, as he himself had done in the case of his father, and in order to render the prophecy impossible of fulfillment, he swallowed each child as it was born, greatly to the sorrow and indignation of his wife, Rhea. She resolved to save the sixth and last child, who was none other than Zeus, and did so by placing a stone in baby-clothes, which Cronus swallowed in his eager haste without noticing the deception. The child was nourished, protected, and educated in Crete, and the stone which had counterfeited him was placed at Delphi, where it was long exhibited as a sacred relic. When Zeus reached manhood, he made war against Saturn and the Titans, and at length deprived his father of supreme power. The career of Saturn as a ruling Greek divinity ceases with his defeat, but like other gods he was supposed to be still in existence, and is by some writers connected with the government of Italy in the time of Janus, sharing sovereignty with the latter. The myth of Saturn swallowing his children is evidently intended by the poets to express the melancholy truth that time destroys all things. The reign of Janus and Saturn was so thoroughly peaceful and happy that it became known as the Golden Age. He was represented bearing a sickle in one hand and a wheat-sheaf in the other. A temple was erected to him at the foot of the Capitoline Hill, in which were deposited the public treasuries and the laws of the state.

SATURN, one of the major planets, which is sixth in distance from the sun. It is the second planet in size, being exceeded only by Jupiter, and has a mean diameter of 71,000 miles. It occupies the most remote position known to the ancients, shines with a feeble but steady pale-yellow light, and to the eye appears as large as a fixed star of the first magnitude. The polar diameter is about 68,000 miles, and the equatorial about 74,000 miles. Its movement upon its axis is with remarkable rapidity, making a complete revolution in 10 hrs. 4 mın. 23.8 sec., thus having a day less than one-half as long as ours. However, its year is much longer, the time of a complete revolution around the sun being twenty-nine and a half earthly years. Its movement can be noted by any careful observer, since it passes



SATURN.

through about 12° of the sky in a year. The weight is estimated at about eighty times that of the earth, but its density is only one-eighth of the earth, being about equal to that of pine wood. Saturn revolves about the sun at a mean distance of 886,000,000 miles, but, as the earth and Saturn occupy different portions of their orbits, the distance between them at different times may vary 200,000,000 miles. Astronomers generally agree in stating that nine satellites attend Saturn, though some writers think even more, and it is surrounded by a system of rings. Some of the rings shine with a golden light and others are transparent. It is thought that the rings are composed of an immense multitude of small satellites, and that many of them resemble the meteors surrounding the sun. The nine satellites are named Tethys, Enceladus, Mimas, Dione, Rhea, Titan, Hyperion, Ipatus, and Phœba.

SATURNALIA (săt-ŭr-nā'lĭ-ȧ), a national festival of the Romans in honor of Saturn, celebrated after the gathering of the harvest, usually from December 17th to the 23d. It was a time of universal cessation from labor, rejoicing, and merry-making. No business was transacted, and the courts were closed, friends sent presents to each other, and school children were given a holiday. Rome was flocked with crowds of people from the surrounding country. All classes partook of the general exultation, giving themselves over to enjoyment, practical jokes, and general rejoicing. Social distinctions were for a time suspended, or even reversed. The Romans entered so heartily into the spirit of this festival that masters waited upon their slaves, the latter being dressed on these occasions in the garments of their superiors. The modern carnival now celebrated in Italy is a survival of the ancient Saturnalia.

SATYRS (sā'tērs), in Greek legends, a race of woodland sprites, who personified the free life of the forest. They were generally represented as half human and half animal, the upper part being that of a human being and the lower that of an animal. Their appearance was both grotesque and repuls-

sive but their life was one of pleasure and self-indulgence, mostly given to the chase and wild music. At intervals they partook of wine and indulged in restful slumber. Both mortals and the gentle woodland nymphs dreaded them, mostly because of their reckless sports. They were represented in the train of Dionysius, and were inseparably connected with his worship. Greek poets delighted to praise the innocent frolics of the little satyrs, and sculptors represented the older forms as nearly approaching human beings, but placed horns upon their heads, and gave them the feet and legs of a goat. The Satyr of Praxiteles at Athens is a famous specimen of Greek sculpture. Pliny used the word to indicate a kind of ape.

SAUERKRAUT (sour'krout), an article of food prepared from cabbage. The cabbage is gathered when the heart is firm, cut into shreds, and packed with salt in a cask or barrel, where it is allowed to ferment under pressure. The addition of caraway seeds, juniper berries, and other condiments improves the taste. Sauerkraut was first made in Germany, but is now produced and sold in the markets of all countries of Europe and America having a temperate climate.

SAUL, the son of Kish, noted as the first king of Israel. His father was a wealthy chief of the tribe of Benjamin, and he was selected for the office by Samuel in response to the request of the Israelites for a king. Saul was a man of large stature and impervious character, and by his courage and military capacity soon won successes over the Philistines, Moabites, Ammonites, Edomites, and Amalekites. Later he became cruel in war, and developed a most pronounced jealousy of his son-in-law, David, who was his attendant and the chief of his escort. Samuel was compelled to retire from his court, and secretly anointed David as king, but did not cease to mourn for the monarch. Saul was defeated in a battle with the Philistines on Mount Gilboa, and killed himself by falling upon a sword. His reign extended from 1095 to 1056 B. C. He was succeeded by David.

SAULT STE. MARIE (sōō sĕnt mā'rĭ), a port city of Michigan, county seat of Chippewa county, on the St. Mary's River, near Lake Superior. It has excellent railroad conveniences, is on the St. Mary's Ship Canal, and on the opposite side of the St. Mary's River is the Canadian town of Sault Ste. Marie, with which it is connected by an international railroad bridge. The manufactures include lumber, sailing vessels, machinery, tobacco and cigars, flour, furniture, leather, and hardware. The city has a fine county court-house, good public school and church buildings, and a public library. It is the seat of a branch of the state fish-hatchery, and has a large trade in fish, lumber, and manufactures. Electric lights, pavements, waterworks, and rapid transit are among the improvements. Extensive timber and minerals abound in the surrounding country. St. Mary's Canal passes around the rapids, and is noted for its vast commercial importance, having a larger traffic than the Suez Canal in Africa. Population, 1904, 11,442.

SAURY PIKE (sa'rў pīk), a kind of fish belonging to the flying-fishes, and peculiar for its greatly prolonged body. It is covered with minute scales, has long jaws resembling a beak, and swims very near the surface, often leaping out of the water and gliding through the air for some distance. This habit is due largely to its seeking to escape the danger of attacks of larger fish and tortoises, and has given it the name of skipper. Several species are native to American and European waters. The American saury pike is remarkable for its long, thin body. These fish are edible.

SAVAGE, Richard, poet, born in London, England, Jan. 10, 1698; died July 31, 1743. He was an illegitimate son of Richard Savage, Lord Rivers, and the Countess of Macclesfield. He studied at the grammar school of St. Albans, and afterward became apprenticed to a shoemaker in Holbourn. When the secret of his birth was accidentally revealed to him, he quit his handicraft to turn his attention to literature. His first writings were comedies, but he is best known for his poetical works, which so impressed Lord Tyrconnel that he gave him an annual pension of $1,000 for some years. Though failing to become poet-laureate after an earnest effort, he received a pension of $250 from Queen Caroline. His best known writings include the poems entitled "Bastard" and "Wanderer." "Love in a Veil" and "Woman's a Riddle" are two well known comedies, and his tragedy of "Sir Thomas Overbury" is his best writing of that class. Dr. Johnson was much in his society, and treated him favorably in his "Lives of the Poets."

SAVANNAH (sa-văn'a), a river of the United States, which rises near the southern boundary of North Carolina, and after a general course toward the southeast flows into the Atlantic Ocean. It forms the boundary between South Carolina and Georgia, is 450 miles long, and is navigable for large vessels to the city of Savannah, eighteen miles from the sea, and for small steamboats to Augusta.

SAVANNAH, an important seaport city of Georgia, in Chatham county, on the Savannah River, eighteen miles from the Atlantic. It occupies a commanding site, has extensive railroad and steamboat connections with other trade centers, and is one of the largest cotton-shipping ports in the United States. It has 225 manufacturing establishments, which produce lumber products, paper, clothing, cotton goods, cigars, furniture, ice, paper, leather, canned fruit, hardware, and machinery. Its harbor is commodious and easily accessible, and

furnishes safe anchorage for a large number of vessels. Savannah is the seat of a vast trade in rice, lumber, cotton, naval stores, fruits, and merchandise. The streets are broad and well shaded with avenues of trees. They have gas and electric lighting, rapid transit, and substantial pavements, and are beautified by numerous parks and gardens. Among the monuments in the city are those built to Count Pulaski and Gen. Nathaniel Greene, and one was erected to the Confederate dead. The city has excellent public schools, several libraries, and numerous charitable institutions. It is the seat of a Roman Catholic bishopric, the Jewish synagogue of Mickva, an Episcopal orphans' home, Masonic and Odd Fellows' halls, numerous churches, and fine city and county buildings. The Christ Church occupies the site on which John Wesley first preached to the colonists in America. Savannah was founded in 1733 by General Oglethorpe. It was occupied by the English in 1778, and taken by the Union army under General Sherman in 1864. It has long enjoyed a rapid and prosperous growth. Population, 1900, 54,244.

SAVE (säv), a river in Austria, which rises in the southeastern part of that country, near the boundary of Italy. After a course of 550 miles toward the southeast it joins the Danube near Belgrade. It separates Carniola from Styria, crosses Croatia, and separates Slavonia from Bosnia and Servia. The valley of the Save is highly fertile, producing large quantities of cereals and fruits. Its principal tributaries are the Unna, Drina, Bosna, and Kulpa rivers. It is navigable for 335 miles.

SAVINGS BANK, an institution for receiving and investing savings. The primary object of savings banks is to encourage thrift and the accumulation of earnings among the laboring, professional, and other classes. They pay interest on deposits at stated intervals, the interest depending on the rate of profit accruing to the bank from loaning the deposits. Savings banks originated in the latter part of the 18th century, and were, in general, managed by persons seeking no remuneration for their services. The first banks of this kind in Europe were established in accordance with suggestions made by Daniel Defoe in 1697, when several small institutions were founded in England. Banks of a similar character were soon after instituted on the continent. The first large savings bank was established at Brumath, France, in 1765; another at Hamburg, Germany, in 1778; one at Berne, Switzerland, in 1787; and the first large institution of this kind in England, in 1799. These particular banks and others of a similar kind furnish depositors an opportunity to place small savings at interest, and the state is the direct security for the repayment of the amounts deposited.

It has been found that savings banks promote habits of economy among the less wealthy classes, and thus constitute a source of much benefit to society generally. The promotion of systematic saving of small earnings has been still farther extended in many European countries by the establishment of post office savings banks, and military and naval savings banks. Postal savings banks were authorized in England by an act of parliament in 1861. Depositors are provided with a deposit-book. Every deposit is entered in the deposit-book by the receiving officer. It is attested by the stamp of his office, and the amount is reported to the postmaster-general the same day it is received. No depositor may place savings exceeding $150 per year and the minimum receivable at any time is twenty-five cents. Military and naval savings banks are designed to accommodate the frugal soldiers and sailors. Institutions of this character are maintained in several countries of Europe.

The savings banks of the United States are under the direction of private corporations. Depositors are protected by state laws in some instances, though a number of the states have not yet provided laws of this character. However, there are building and loan associations, a form of coöperative savings banks, in all the states. These institutions take the place of savings banks in many respects, but money is loaned only to members on improved real estate security. The first savings bank incorporated in the United States was the Boston Provident Savings Institution, in 1816, and the same year was founded the Philadelphia Savings Fund Society, but it was not incorporated till 1819. More than a thousand similar institutions are maintained at present in the United States, all of them resembling the common plan in receiving deposits and paying a rate of interest according to the banks' profit from loaning the deposits. Depositors are provided with a pass-book, in which all sums of money deposited by individuals, corporations, or societies are entered, and in it is made an account of the withdrawals.

The laws of some states provide that depositors shall be amply secured, and in several there are provisions limiting the amounts deposited by any one person. In some cases the laws exempt from liens and execution the deposits made by minors and females. These banks are limited in some states by statutory law as to the character of investments that may be made with the deposits, and the amount that is to be invested in proportion to the receipts of the bank. In most states provisions have been made for the examination of the condition of the banks at regular intervals. Only ten savings banks were maintained in the United States in 1820, in which $1,138,576 were deposited by 8,635 persons. The enormous growth of these institutions may be seen

from the report of 1900, when there were 1,002 savings banks, in which $2,449,547,885 were deposited by 6,107,083 persons.

SAVONAROLA (sä-vo-nä-ro'lä), **Girolamo**, eminent reformer and statesman, born at Ferrara, Italy, Sept. 21, 1452; died May 23, 1498. He descended from a noble family, received early instruction under efficient tutors at home, and in 1474 was sent to Bologna, where he entered the Dominican Order. After studying Greek philosophy and theology, he was sent to St. Mark's Convent at Florence, and began to preach there in 1482. Though spiritually strong, he possessed a harsh and unpleasant voice, which caused his lectures to be poorly attended. Soon after he was sent to the convent at Brescia, where he overcame his former defects and attained such fame as a preacher and theologian that he was recalled to Florence in 1489, where he became prior of St. Mark's in 1491. His sermons were directed against the vices and luxuries practiced by the wealthy at Florence and he foretold that desolation would be spread in Italy by the invasion of foreign enemies, a prediction verified in 1494 by the entrance into Italy of Charles VIII. of France.

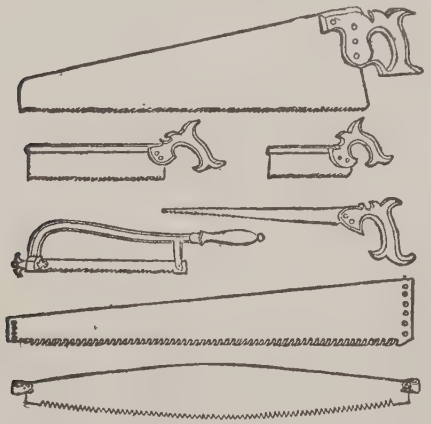
At that time Savonarola was favored by both the government and the church, and his eminent ability led the pope to appoint him vicar-general of the Dominican monks in 1493. In that capacity he labored successfully to make the order better and purer. As he was dissatisfied with the aristocratic government of Florence under the Medici family, he welcomed the French under Charles VIII. when invading Italy, and joined a committee to invite him to Florence. The city soon fell under the attacks of the French, and when the army of France was compelled to withdraw from Italy Savonarola organized a republic, which was governed by two councils and a signory. Though he held no office, he was in fact the most potent influence in the new government. Not content with reforming Florence, he began to organize a crusade to revolutionize the Roman court and to place the clergy on a more satisfactory basis. He wrote the Christian princes with the view of securing their assistance, charging that the church was corrupt, and suggesting to them that a general council should be convoked to secure relief from oppressive practices.

While the followers of Savonarola looked upon him as a prophet, the church became arrayed against him, and at length Pope Alexander VI. excommunicated him by issuing a bull. This was read in the Florence cathedral in 1497, and Francesco di Pugli, a Franciscan friar, publicly denounced him. Difficulties began to deepen, both in the church and government, and finally the ordeal of fire was agreed upon to test the truth of the pretentions of Savonarola as to having divine power. A disagreement caused the plan of carrying out the ordeal to fail, and he withdrew to St. Mark's Convent, where he was arrested by a mob and cast into prison. In the meantime the city government passed to those opposed to Savonarola. Thus deserted by church and state, he was put through a mock trial with torture and condemned to die as a heretic. He and two other Dominicans, named Silvestro Maruffi and Domenico Buonvicini, were strangled at Florence on May 23, 1498, and the bodies were burned. Writers generally agree that Savonarola was a man of remarkable genius, and an enthusiastic and devoted reformer. His writings are very numerous, both in the Latin and Italian, the principal works embracing "Simplicity of the Human Soul;" "Perfection of the Spiritual Life;" "Triumph of the Cross;" "Treatise on Humility;" "Mysteries of the Mass;" "State of Widowhood," and "Love of Jesus Christ."

SAVOY (sa-voi'), **House of**, a distinguished royal house of Europe, which is now represented in Italy by the reigning dynasty. It may be said to be traceable back to the year 407 A. D., when the small territory of Savoy was seized by the Burgundians from the declining power of Rome. Emperor Henry V. bestowed the title of count of Savoy on Amadeus III. in 1111, and Emperor Sigismond, in 1416, made Amadeus VIII. the first duke of Savoy. From 1485 the dukes of Savoy claimed to be kings of Cyprus and Jerusalem, but the title of king was not generally recognized until the treaty of Utrecht was concluded, in 1713. That treaty ended the War of the Spanish Succession and gave to Victor Amadeus II. the island of Sicily and a part of the duchy of Milan, and conferred upon him the title of king. He was compelled to surrender Sicily to Austria in 1720, but received in exchange the island of Sardinia, which, along with his other possessions, was erected into the kingdom of Sardinia.

SAW, an instrument having usually a tempered steel blade with pointed teeth arranged continuously, and used to cut wood, stone, metal, or other substances. Many different kinds of saws are employed in the arts and industries, their form, size, and shape depending upon the uses for which they are intended. The smallest are those used in surgical and dental operations, and from these they range to the great saws employed in sawmills for cutting the largest timber. The best saws are of tempered steel, ground smooth and bright, and the teeth are either cut, filed, or punched; but in larger ones, especially circular saws, inserted and removable teeth are employed to a considerable extent. To manufacture a first-class saw it is necessary to secure uniform thickness in the blade. It is required to have elasticity sufficient to spring back into shape, if bent into a bow by accident. The teeth are sharpened with a triangular file, the blade of the saw being first fixed in a whetting-block. When inclined forward

or backward, they are said to rake, and to give better clearance the teeth are alternately inclined laterally; thus they cut a little wider than the blade, and this is called the set. The two general classes of saws are known as hand-saws and machine saws, and of each there are numerous kinds. Hand-



SOME FORMS OF SAWS.

saws are variously named, according to the uses they serve. The most common forms include the panel-saw, meat-saw, ripping-saw, frame-saw, keyhole-saw, tenon-saw, dovetail-saw, and sash-saw. All these are for use by one person, and the blade tapers in width from the handle. The crosscut-saw is intended for two persons, having a handle at each end, but there are forms of crosscut-saw designed for use by one person. A circular saw consists of a disc having saw-teeth cut or fixed in its periphery. It is mounted on an arbor, with which it rotates, usually at a high speed. The circular saw is used in sawmills, often one saw above another, and the log is pushed against it by means of a traveling platform; but it is also used for cutting across blocks of wood, as cutting cordwood for fire lengths.

Three forms of sawing machines are used in the saw mills, these including the circular, band, and straight saws. Where large logs are cut, two circular blades instead of one are used, the advantage being that lumber may be cut with greater rapidity, while timber may be saved in that the kerf or groove can be less wide. Besides, two saws arrayed in this way make it possible to drive them faster and secure a truer cut. A band-saw is one made by placing a thin endless saw like a belt over two wheels, the band passing rapidly and operating on the material moving against it, either by hand or on a platform. Band-saws are used largely for resawing, and a saw-deflector is often used to keep the belt in line. Straight saws are of two kinds; the drag-saw for cutting a log in two, and the jig-saw for light ornamental work. Circular blades are used largely in metals; some are toothed, while others are plain, the friction of rapid rotation cutting the metal. Toothless blades are used quite largely in marble and other stone. Many saws have come into use for special purposes, such as are employed for rabbeting and cutting weather-boards, and for circular and ornamental work. Saw mills are large establishments for sawing logs into lumber by power, either steam or water power being used. It may be said that saw mills are comparatively modern, the earliest having been built at Augsburg, Germany, in 1322. The first one set up in England was built by the Dutch in 1663, near London, but prejudice against labor-saving machinery caused the populace to destroy it. The saw mills of the United States constitute a vast industry, millions of feet of lumber being cut for domestic use and exportation.

SAW-FISH, a genus of fish bearing resemblance both to the sharks and rays, and distinguished by having a long beak or

COMMON SAW-FISH.

snout. They attain a length of from ten to twenty feet, and may be counted among the most savage of fish. The beak is often six feet long. It has from sixteen to twenty-eight pairs of teeth set horizontally in sockets, and is used to rip or tear open its prey. Saw-fish have been known to inflict mortal wounds on whales. Their flesh is too coarse to be eaten. Many species have been enumerated. The common saw-fish, native to the Atlantic from Maine to Florida, is the best known.

SAWYER, Thomas Jefferson, teacher and clergyman, born in Reading, Vermont, Jan. 9, 1804; died July 24, 1899. He graduated from Middlebury College in 1829, and from 1830 to 1845 was a Universalist pastor in New York City. While there he edited the "Christian Messenger." In the latter year he was appointed principal of the Liberal Institute, at Clinton, New York, where he taught classes in theology until 1852, when he resumed pastoral work in New York City, continuing till 1861. From the latter year till 1869 he taught theology at the Liberal Institute, when he was chosen professor at Tufts College, Medford, Mass. Sawyer defended the doctrines of Universalism in various writings and discussions, and brought profound scholarship and culture to its support. His writings include "Endless Punishment;" "Doctrine of Universal Salvation," and "Who is Our God—the Son, or the Father?"

SAXE (saks), **John Godfrey**, poet, born in Highgate, Vermont, June 2, 1816; died March 31, 1887. After graduating at Middlebury College in 1839, he studied law at St. Albans, Vermont, where he was admitted to the bar

in 1843. He established a successful practice in Franklin county, served as attorney in Chittenden county, and was superintendent of common schools for two years. In 1850-56 he edited the "Burlington Sentinel," was attorney for Vermont one year, and in 1859 and 1860 was an unsuccessful candidate on the democratic ticket for governor of Vermont. Saxe wrote many poems, and was greatly in demand as a lecturer, especially at school and college commencements. The later years of his life were spent in Albany, New York, at the home of his son. His principal writings include "Clever Stories of Many Nations;" "Proud Miss McBride;" "Money King and other Poems;" "Fables and Legends of Many Countries;" "Masquerade;" and "Leisure Day Rhymes." He contributed extensively to the "Atlantic Monthly," "Harper's Magazine," and "Knickerbocker Magazine."

SAXE, Maurice, Marshal, eminent soldier, born at Goslar, Germany, Oct. 28, 1696; died Nov. 30, 1750. He was a son of Augustus II., elector of Saxony, and the countess of Königsmark. In 1708, when only twelve years old, he was led by his fondness for military life to leave home and join the army of Marlborough in Flanders, with which he was present in the capture of Lille and the siege of Tournay. He joined the Russian army stationed in Poland in 1711, taking part in the battle of Riga, but in 1714 returned to his home in Dresden, Germany. After obtaining a pension from his father, he went to Paris in 1720 to study military tactics, and in 1726 became duke of Courland, from which he was compelled to retire after resisting the allied Russians and Poles for three years. His brother, Augustus III., succeeded his father to the throne of Saxony and offered him command of the Saxon army, but he declined and accepted in its stead a command in the army of France, and for distinguished services at Ettingen and Philippsburg was made marshal of France in 1744. He commanded the French army in Flanders with superior tact in 1745, and gained a victory over the English under the duke of Cumberland at Fontenoy. In 1746 he defeated the allies at Roncoux, and the following year was victorious over their forces at Lawfeld, Bergenop-zoom, and Maestricht. The peace of Aix-la-Chapelle soon followed. It may be said that the decided advantages gained by France are due largely to the military genius of Saxe. Soon after he took up his residence on his estate at Chambord, France, where he died of dropsy.

SAXHORN (săks'hôrn), a wind instrument much used in military bands. It was invented at Paris, France, in 1842 by Adolph Sax, a native of Belgium. It has a long, winding tube with a wide, bell-shaped opening, is supplied with from three to five valves, and possesses a large compass with full, rich tone. Several sizes and varieties are in use, thus supplying the necessary instruments to make up a whole band, but the tone is not sympathetic enough for fine orchestral use. Military music has been much influenced by the saxhorn and another instrument by the same inventor called saxophone. The latter has a clarionet mouthpiece and a single reed. Its body is a parabolic cone of brass provided with a set of keys. It is of value in military bands, and, like the saxhorn, is easily learned and carried.

SAXIFRAGE (săks'ĭ-frăj), an extensive genus of hardy perennial herbs, with alternate leaves and simple flower-stems. They

EARLY AND TUFTED SAXIFRAGE.

are distinguished by a many-seeded capsule, have leaves six to seven inches long, and the stalks are one to two feet high. The flowers are yellow, white, or red, and most of the plants grow in rocky places, to which their clustered roots are well adapted. About 160 species have been described, many of them being domesticated for ornamental garden plants, and fully 50 are native to America. Plants of this genus are confined largely to the colder and temperate parts of the northern hemisphere.

SAXONS (săks'ŭns), one of the races of people that originally inhabited the northern part of Germany, and called Sachsen in the German. They are first mentioned in history by Ptolemy, in whose time they occupied a large region between the Elbe, Trave, and Eider rivers. By the third century of the Christian era their numbers had increased materially, and they organized themselves into a confederation, which occupied the northwestern part of Germany. Subsequently they formed an alliance with the Franks. They invaded Roman territory in the times of Emperors Julian and Valentinian, and about the same time made settlements on the coasts of Gaul and Britain. It is probable that the first Saxon settlements were made in Britain as early as 287, but

their union with the Angles and Jutes appears to have been formed about 450, and about that time they conquered a large region of that island, giving to the people of England the name of Anglo-Saxons. Their principal settlements in England were in Sussex or South Saxon, and Essex or East Saxon. The Saxons remaining in Germany occupied a vast region that became known as Alt Sachsen, or Old Saxon, but its limit cannot be easily defined, since frequent wars against invading tribes changed the boundaries at various times. It may be generally defined as including the country enclosed by the North Sea, the Hartz Mountains, the Rhine, and the Elbe. In 531 they fought under an alliance with the Franks against the Thuringian kingdom, which they subdued and destroyed, and in consequence added it to their possessions. In 719 a prolonged war arose between the Saxons and the Franks, which terminated in 804 by Wittikind, the last Saxon king, submitting to the Franks under Charlemagne. At that time they gave up paganism and adopted Christianity as their religion.

SAXONY (săk'sō-nĭ), **Kingdom of**, an important kingdom of Germany, lying north of Bohemia and east of Silesia. Its length from east to west is about 135 miles, breadth seventy-five miles, and area 5,788 square miles. Practically all of Saxony lies in the Elbe basin, being drained by that river and its tributaries—the Elster, Mulde, and Spree rivers. A small part in the east is drained into the Oder by the Neisse. It is separated from Bohemia by the Erzgebirge, and slopes gradually toward the north, most of its surface being fertile and undulating. The region has valuable deposits of granite, iron, silver, tin, nickel, lead, bismuth, cobalt, zinc, arsenic, antimony, and coal. Its mines are among the most important of Germany, especially those producing iron and coal. The soil products embrace cereals of all kinds, vegetables, pears, apples, plums, and grapes. Horned cattle, horses, milk cows, swine, sheep, and poultry are produced in abundance. The manufactures include large quantities of cotton and woolen goods, ribbons, silk textiles, pottery, leather, chemicals, and machinery. Saxony is traversed by a large number of railroads, including a total of 2,125 miles, and it has excellent highways and numerous telephone and telegraph lines.

Saxony is divided for governmental purposes into the four districts of Leipsic, Dresden, Bautzen, and Zwickau. Its government is a constitutional monarchy, under the constitution of the German Empire. The crown is vested in the Albertine line, and there is a legislative assembly of two houses, the higher chamber of which is formed of princes of the royal family, nobles, proprietors, and representatives of the universities; and the lower chamber of deputies from the towns and rural communes. Lutheran is the state religion, but all religious forms are tolerated. The University of Leipsic is the recognized head of its educational affairs, and there is an excellent system of public schools, including kindergartens, elementary schools, gymnasia, and real-schulen. The government owns practically all the railroads and telegraph lines, and fosters agricultural and industrial arts by the maintenance of institutions of learning devoted to special lines. All male citizens are required to serve three years in the army, but in addition are classed for four years in the reserve and five in the landwehr. The kingdom has four votes in the federal council of the German Empire, and is entitled to twenty-three deputies in the reichstag. Dresden is the capital. Other important cities are Leipsic, Plauen, Chemnitz, Freiberg, and Zwickau.

The people of Saxony are descendants from the Sachsen, or Saxons, and the reigning dynasty descended from Wittikind, the last Saxon king, who was conquered by Charlemagne in 804. At that time they became a part of the German Empire, but the territory now included in Saxony does not correspond to the regions then occupied by them, when it was farther toward the north. It was made a dukedom in 880, when Otto became the first duke, reigning till 912. His administration greatly extended the territory by conquests from the Normans, and his son, Duke Henry (912-936), became emperor of Germany in 919. The duchy passed to the Bavarian branch of the Guelph family in 1127, and Rudolph II. (1356-1370) assumed the title of elector of Saxony. John George I. (1611-1656) sided with the Protestants in the Reformation and joined Gustavus Adolphus, his army taking part in the battles of Bridenfeldt and Lützen. Frederick Augustus I. (1694-1703) embraced Catholicism in 1697 to become king of Poland, since which time the court of Saxony has been Roman Catholic, but the state religion Protestant. Frederick Augustus II. (1733-1763) joined the War of the Austrian Succession against Maria Theresa, and during the Seven Years' War the country was ravaged, and it was many years before prosperity was fully restored. Frederick Augustus III. (1763-1827) first fought against France, but his army went over to Napoleon's side after the battle of Jena, and he received in return the title of king and large additions of territory.

Saxony became the battle-ground between Napoleon and the allies in 1813. Within its confines were fought the decisive battles of Lützen, Dresden, Bautzen, and Leipsic. When the congress of Vienna, in 1814, adjusted the division of territory, a large part of Saxony was turned over to Prussia. Peace was not disturbed after that until the Revolution of 1848-49, but in the Austro-Prussian War of 1866 Saxony sided with Austria, and was immediately invaded by a

Prussian army. After the war Saxony became incorporated with the North German Confederation, since which time it has enjoyed remarkable prosperity in railroad building and manufacturing enterprises. When Napoleon III. declared war against Prussia, in 1870, Saxony rallied to the support of the German states, its present king, Albert, commanding the army of the Meuse. In 1871 it became a part of the German Empire. Population, 1900, 4,199,758.

SAXTON, Joseph, inventor, born in Huntingdon, Penn., March 22, 1799; died in Washington, D. C., Oct. 26, 1873. After attending the public schools, he became apprenticed to a watch-maker, and soon after removed to Philadelphia. There he invented a machine for cutting the teeth of watch wheels, an invention that has revolutionized the art of making watches and clocks. He constructed the clock for the tower of Independence Hall. In 1828 he went to England, where he remained till 1837, and while there constructed a magneto-electric machine and a locomotive differential pulley. After returning to the United States, he became superintendent of the responsible work of constructing the machinery and balances for the United States mint at Philadelphia. His later inventions include an immersed hydrometer, a deep-sea thermometer, and a self-registering time-gauge.

SAY, Jean Baptiste Leon, statesman, born in Paris, France, June 6, 1826; died April 21, 1896. He secured a liberal education, and made political economy a special study and after the fall of Napoleon III. supported the republic. In 1871 he became a member of the national assembly, was made minister of finance by M. Thiers the following year, and in 1875 was again appointed to the portfolio of finance in the administration of M. Buffet. This position he held in the succeeding administrations, and in 1880 became ambassador to London, but returned to Paris a few weeks later in consequence of having been elected president of the senate. He wrote a number of excellent works on history and political economy, and in 1880 was honored by membership in the Academy of Moral and Political Sciences.

SAYCE (sās), Archibald Henry, Oriental traveler, born near Bristol, England, Sept. 25, 1846. He studed at Grosvenor College and at Oxford, and became tutor at Queen's College in 1870. In the same year he took orders in the Anglican Church, and six years later became deputy to Max-Müller as professor of philology, a position he held till 1890. In the latter year he visited Egypt, where he studied Egyptian inscriptions. Among his writings are "Fresh Light from the Ancient Monuments;" "Principles of Comparative Philology;" "Ancient Empires of the East;" "Assyrian Grammar;" "Chaldean Genesis;" "Higher Criticism and the Verdict of the Monuments;" "Races of the Old Testament," and "History of Babylonia."

SCAB, a contagious disease common to sheep, but which also attacks horses and cattle. It is due to a minute insect burrowing in the skin, causing baldness and itching. The disease is favored by dirt. Among the remedies are turpentine, mercurial ointments, tobacco water, and solutions of arsenic. The remedies should be carefully applied and repeated a number of times.

SCALLOP (skŏl'lŭp), the name of several species of shell-fish, so called from their round, ribbed shell with scalloped edges. They are classed as bivalves, having shells connected at the upper side with a hinge. The shells are fan-shaped, and have numerous green eyes on the inner fold or mantle. The fish is enabled to swim by means of a little air-bag inside, and it is facilitated in movement by opening and shutting its shell. Young scallops are frequently seen swimming in the water, but the older animals attach themselves to rocks, where they remain stationary like oysters. The term scalloped oysters was derived from the circumstance that the shell was used frequently in cooking oysters. Scallops abound in almost all seas, about 200 species being known; many of them are edible. In the Mediterranean, off the coast of Palestine, scallops are quite abundant, and were caught from remote antiquity, their shells being converted into souvenirs for those visiting the Holy Land. A number of species are abundant off the coasts of New England and the middle states, where they are caught extensively for food.

COMMON SCALLOP.

SCALP, the skin forming the outer covering of the skull. It is quite the same as the skin growing on other parts of the body, differing from it only in having a more prolific growth of hair, and being composed of an expanded muscular tendon in addition to the ordinary skin, through which many blood-vessels permeate. The term scalp is generally applied to all the part of the skin of the head to which hair belongs. Formerly the American Indians used the scalping knife to remove a part of the scalp from those killed or taken captive in war. Frequently the victim was alive when the scalp was being removed. Indian warriors who secured the greatest number of scalps were highly honored, and it was a matter of pride to wear a large number as trophies dangling from the belt.

SCANDERBEG (skăn'dĕr-bĕg), patriot and prince of Albania, born in Croia about

1404; died at Alessio, Jan. 17, 1467. His proper name was George Castriota, being the son of John Castriota, but Scanderbeg is the name applied to him by the Turks, meaning Alexander Bey. The Turks took him a captive when seven years old, and his physical beauty and intelligence so pleased Sultan Amurath II. that he was brought up in his palace in the Moslem faith. He received instruction in the Turkish, Slav, Arabic, and Italian languages, and upon reaching maturity was put at the head of a Turkish army. In 1433 he greatly distinguished himself as a Turkish pasha. Soon after he learned that his father's estate had been confiscated, when he resolved to return to his native land. He accordingly deserted the Turkish army in 1443, taking with him a number of Albanians, and renounced the faith of the Moslems. All of Albania was soon in arms under his leadership, and with an Albanian army of 15,000 he repeatedly defeated the Ottoman forces. Mohammed II. took the field against him in person, but was obliged to accept terms of peace. It was the ambition of the pope to secure a powerful Christian alliance to aid Scanderbeg, but failing in this the latter maintained the independence of Albania for twenty-four years, and in the meantime defeated the Turks in twenty-two battles. The Turks reduced Albania shortly after his death.

SCANDINAVIA (skăn-dĭ-nā′vĭ-ạ), anciently the name of the region now included in the kingdoms of Sweden, Norway, and Denmark. At present it is variously applied to the language and literature of the people occupying this region and Iceland. The Scandinavian peninsula is situated in the northwestern part of Europe. It is bounded on the east by Finland, the Gulf of Bothnia, and the Baltic Sea, south by the Skager Rack and Cattegat, west by the Atlantic, and north by the Arctic. It is 1,240 miles long, from 225 to 260 miles wide, and has an area of 298,000 square miles. The two kingdoms of Sweden and Norway occupy the whole of the peninsula, and south of it, across the Skager Rack and Cattegat, is the kingdom of Denmark. A Teutonic people occupied most of the region in the early historic period of Europe. The inhabitants of the territory now included in Denmark and Schleswig were known to the Romans by the name of Cimbri, and the region occupied by them as the Cimbrian peninsula. In the 9th century large numbers of Vikings or Northmen moved in their galleys along the coasts of northern Europe, visiting England, France, Germany, Spain, and Italy. In these movements they plundered cities and the coast regions, but founded new states and materially influenced the industries and the language. Scandinavian literature includes a number of valuable productions, the most notable being the Sagas and Eddas. See **Iceland.**

SCARABÆUS (skăr-ạ-bē′ŭs), an extensive genus of insects, including about 3,000 species. The greater number are native to tropical countries, but species of the genus are found in nearly all countries. Those of tropical regions include the largest of beetles, and the size decreases with the colder latitudes, those found in central North America and Eurasia being comparatively small. The dung-beetles are well known types of this class of insects. They are useful in warm and temperate countries for their habit of removing offensive matter, which they roll in the form of balls. They often lay their eggs within the balls and bury them below the surface. The sacred scarabæus of Egypt is another familiar kind. It is still the type for the Egyptian scarab, an ornament made in the shape of a beetle of hard stone or gems. This beetle was worshiped by the ancient Egyptians. It was embalmed for centuries. Many of the tombs and monuments of Egypt contain representations, and they are often accompanied by hieroglyphics. Many scarab gems were also engraved by the Greeks and Etruscans.

SCARLATINA (skär-lạ-tē′na), or **Scarlet Fever,** an infectious specific form of fever. It is most prevalent among children, but occurs at any age. Scarlatina consists of an inflammation of the skin and extends along the mucous membrane of the throat. It is attended by a contagious fever, and followed on subsidence of the fever by scaling off of the cuticle. Three more or less distinct forms are recognized, all requiring careful attention. Scarlatina simplex is a mild form of scarlet fever; scarlatina anginosa is a form with intense fever, extensive ulceration of the throat, and livid rash; and scarlatina maligna is a form of the disease in which all the morbid conditions are distinct and usually proves fatal. Headache, shivering, frequent pulse, loss of appetite, and flushed face are among the early symptoms of the disease. Eruptions about the size of a pin-head appear on the skin the second or third day, when the throat is largely affected and the tonsils become swollen. Since it appears as an epidemic, it includes both mild attacks and epidemic forms uniformly severe.

SCHAFF (shäf), **Philip,** American clergyman, born in Coire, Switzerland, Jan. 1, 1819; died Oct. 20, 1893. After studying at the German universities of Tübingen and Halle, he took an extended course in Berlin, where he began to lecture on theology in 1842. The next year he was recommended to fill a professorship of church history in the Theological Seminary at Mercersburg, Penn., an institution belonging to the German Reformed Church. He entered upon this work with marked success in 1844, was sent to represent his church at the ecclesiastical diet at Frankfort, Germany, in 1854, and in 1862 became lecturer of Andover Seminary. After serving in that capacity

till 1870, he was made professor in the Union Theological Seminary, New York City, where he lectured with remarkable energy till 1893. Schaff served as president of the American committee on Bible revision in 1871, visited Palestine in 1877, and was the first president of the American Society of Church History, an organization formed in New York in 1888. His last public discourse was delivered in 1893 before the parliament of religions in Chicago. Among his writings are "History of the Christian Church; "Creeds of Christendom;" "History of the Apostolic Church," and "Person of Christ." A number of his writings have been translated into French, Greek, Italian, Bulgarian, Chinese, Japanese, Hindustani, and Arabic.

SCHAUFFLER (shaw'fler), **William Gottlieb**, eminent missionary, born in Stuttgart, Germany, Aug. 22, 1798; died in New York City, Jan. 26, 1883. After studying for some years in Germany, he conducted missionary work in Turkey, and came to the United States in 1827. Later he entered Andover Seminary to take a course in theology, and soon after again entered the missionary work, making it a specialty to labor among the Jewish people. His principal field of activity was in Constantinople, where he spent forty years among the Jews and Armenians. While there he translated portions of the Bible into the Turkish and Hebrew-Spanish languages. Few missionaries have been as successful in learning languages, and none have wielded a wider personal influence than he. His writings show that he mastered fully twenty different tongues sufficiently to read them with accuracy, and he spoke ten of them fluently. Among his chief writings are "Trumpeter of Sackingen;" "Essays on the Right Use of Property;" "Meditations on the Last Days of Christ," and "Songs of the Time of Heinrich von Osterdingen."

SCHEELE (shā'lẹh), **Carl Wilhelm**, eminent chemist, born in Stralsund, Germany, Dec. 19, 1742; died May 21, 1786. He was apprenticed to an apothecary in Gottenburg, Sweden, where he secured his early knowledge of chemistry, and in 1767 located as an apothecary in Stockholm. In 1770 he removed to Upsala, where he carried on extensive investigations in chemistry. At that time he announced discoveries that placed him in the front rank of original investigators. His chief discoveries were tartaric acid in 1770, chlorine and baryta in 1774, oxygen in 1777, and glycerine in 1784. Oxygen had already been discovered and made known by Priestley, but Scheele was not aware of that fact at the time he announced its properties. He discovered arsenite of copper while experimenting on arsenic and its acid, which is generally known under the name of Scheele's green. He was an associate of the Academy of Stockholm, through which he communicated his discoveries from time to time. His principal writings include "Chemical Treatise on Air and Fire" and "Coloring Matter in Prussian Blue."

SCHEFFER (shĕf'ẹr), **Ary**, eminent painter, born in Dordrecht, Holland, Feb. 12, 1795; died near Paris, France, June 15, 1858. He studied drawing in his native town, but later took a complete course in Paris, where he produced his first work in 1812. His paintings were influenced largely by Goethe, Byron, and Dante, from whose writings he selected many of his early subjects. These he beautified by a subtility and grace of imagination that made them highly popular, and many of them have been engraved in a number of European countries. His most noted paintings include "Faust in his Study;" "Margaret at the Well;" "Dante and Beatrice in Heaven;" "Suliote Women," and "Christ on the Cross." Among his remarkable portraits are those of Lamartine, Lafayette, Talleyrand, Madame Guizot, Liszt, and Beranger. His later works include principally views from the Bible, among them "Temptation of Christ;" "Christ, the Consoler," and "Christ, the Remunerator."

SCHELDT (skĕlt), a river of Europe, one of the most important of Belgium and the Netherlands. It rises in the French department of Aisne, flows north through Belgium, and enters the North Sea by two arms, known as the Eastern and Western Scheldt. Its entire course is 260 miles, of which about 210 miles are navigable. Among the flourishing cities on its banks are Ghent and Antwerp, and there are numerous canals connecting it with other river systems, thus forming a very important commercial highway. The lower course was entirely monopolized by Holland in the 17th and 18th centuries, other nations using it being compelled to pay toll for the passage of vessels. When Holland and Belgium separated in 1831, these rights passed to the latter country, but in 1863 other powers were given the right to use the river for commercial navigation in consideration of the payment of $3,750,000.

SCHELLING (shĕl'ing), **Frederick William Joseph**, eminent philosopher, born in Leonberg, Germany, Jan. 27, 1775; died Aug. 20, 1854. His father was a pastor of Leonberg, near Stuttgart. He first studied philosophy and theology at Tübingen, and later stook a course in mathematics and science at Leipsic, and subsequently at Jena, where he became professor of philosophy in 1798. In that position he succeeded Fichte, who had guided his philosophical studies as a teacher. About that time he published "On the Real and Ideal in Nature." He became professor at Wurzburg in 1803, and in 1808 was called to Munich as secretary to the Academy of Arts. There he remained thirty-three years, fourteen of which he occupied the chair of philosophy in the University of Munich, but in 1841 was called to Berlin by Frederick Wil-

liam IV., where he resided most of the succeeding years of his life. His death occurred while at the Bass of Ragaz, Switzerland. The philosophical speculations of Schelling were influenced largely by Fichte and Hegel, and in the early period partook quite largely of a pantheistic nature. Later his philosophy became more closely associated with that of Spinoza and Brehme, but may be said to represent a distinct line. His later speculations were based principally on mythology and revelation, which he called positive philosophy to distinguish it from his speculation on identity, called by him negative philosophy. His writings are very numerous and scholarly, and are confined almost exclusively to philosophical research and speculation. Among the most important are "System of Transcendental Idealism;" "Soul of the World;" "Introduction to the Philosophy of Mythology;" "Inquiry into the Nature of Human Freedom;" "Philosophy of Revelation;" "Philosophy of Nature," and "Exposition of My System of Philosophy." He edited, in conjunction with Hegel, "Critical Journal of Philosophy," and published a valuable work entitled "Exposition of the True Relation of the Philosophy of Nature to the Amended Theory of Fichte."

SCHENCK (skĕnk), **Robert Cumming**, soldier, born in Franklin, Ohio, Oct. 4, 1809; died in Washington, D. C., March 23, 1890. His ancestor, Roelof Martense Schenck, came from Holland to New Amsterdam in 1650. After graduating from Miami University, he studied law and entered upon a successful practice at Dayton, Ohio. He was a member of congress in 1843-51, became United States minister to Brazil in the latter year, and in 1861 entered the United States army as brigadier-general of volunteers. In 1861 he commanded at the first battle of Bull Run, and in 1862 in the battle of Cross Keys and the second battle of Bull Run, receiving a gun-shot in the latter that shattered his right arm. He resigned from the army in 1863, and in the same year was reëlected to congress, where he served until 1869. In 1871 he became United States minister to England, but resigned in 1876 to resume the practice of law at Washington, D. C.

SCHENECTADY (skę-nĕk'tą-dy), a city of New York, in Schenectady county, on the Mohawk River, sixteen miles north-west of Albany. Its situation on the Erie Canal and a number of important railroads gives it excellent trade and manufacturing advantages. It has many excellent buildings, good public schools, and a number of institutions of higher learning. Union College, an institution founded in 1795, together with the Albany Medical and Law Schools, form Union University. Among its manufactures are cotton and woolen goods, flour, machinery, farming implements, cigars, varnish, carriages and wagons, iron bridges, and locomotives. It is supplied with electric and gas lights, waterworks, street railways, pavements, libraries, and public parks. The first settlement on its site was made by Dutch traders in 1661, and a charter was issued in 1684. It was burned by the French and Indians in 1690. In 1798 it was incorporated as a city. Population, 1900, 31,682.

SCHILLER (shĭl'ęr), **Johann Christoph Friedrich von**, eminent poet, born at Marbach, Germany, Nov. 10, 1759; died May 9, 1805. He was the son of Kaspar Schiller, an overseer of the nurseries of the duke of Würtemberg. After receiving instruction under private tutors, he was taught in a school at Lorch, and in 1773 entered the academy founded by the duke of Würtemberg at his castle, known as The Solitude. There he studied law and medicine, but became greatly interested in literature, especially poetry. His first poem was written in 1772 while still attending the school at Lorch, and ever after poetry remained his chief delight, his principal interest being in epic and dramatic idealism. He completed the first sketch of "The Robbers" in 1778, which was published in 1780, and two years later was produced on the stage at Mannheim, where it was received with remarkable enthusiasm. Schiller was present at the time without the knowledge of his superiors, which caused his arrest, and finally he left the service of the duke and went to Franconia, where he wrote a number of productions under an assumed name, that of Bauerbach. The writings produced at that time include "Cabale" and "Liebe," and about the same time he outlined "Don Carlos."

FRIEDRICH VON SCHILLER.

In 1783 Schiller became connected with the theater at Mannheim as dramatist, but two years later proceeded to Leipsic, where he formed an acquaintance with Huber and Kroner. At that time he wrote his "Lied an die Freude," and made a systematic study of Philip II. His "Don Carlos" was published at Dresden in 1787, and was followed by his "History of the Revolt of the Netherlands." In the same year he visited Weimar, where he met Herder, Wieland, and Goethe, and through the influence of the last named writer secured a professorship of philosophy at Jena. The duke of Saxe-Weimar granted him a pension, by which he was enabled to provide himself with necessary books of reference, and in 1790 married Charlotte von Lengefold. In 1793 he completed his "History of the Thirty Years' War," and once more turned his attention to the production

of poems and ballads of the most excellent quality. He lived at Weimar after 1798, where his friendship with Goethe became proverbial, and devoted the remaining years of his life with persevering industry to literary labor. His most noted dramas include "Wallenstein;" "William Tell;" "Mary Stuart;" "The Bride of Messina," and the "Maid of Orleans." Other works of importance not named above embrace "Historical Memoirs from the 12th Century to the Most Recent Times;" "Friesco;" "Song of the Bell;" "Gods of Greece;" "Ghost-Seer;" "Letters on Æsthetic Culture," and "Ideals and Life." Schiller was the recipient of many distinguished honors, and was raised to the rank of nobility in 1802. He is by common consent classed among the greatest poetical geniuses of the world; a tireless student, and an interesting, earnest, and thoughtful writer. Few writers have been as prolific in producing, and none have exceeded him in adding gems of great value to the collective writings of the world. His death resulted largely from overwork, since he continued industriously at his favorite task of writing until the last. He had two sons and two daughters. His widow died in 1826.

SCHILLING, Johann, sculptor, born in Mittweida, Germany, June 23, 1828. He studied at Dresden and Berlin, and in 1851 exhibited his first notable work, entitled "Amor and Psyche." The exhibit of this excellent production of art procured him a two years' scholarship at Rome, but in 1856 he settled at Dresden, where he became professor in the academy in 1868. Among the most notable of his productions are the statue of Schiller, at Vienna; the monument of Luther, at Worms; the "War Monument," at Hamburg; and the "National Monument," on the Niederwald. The last named was unveiled in 1883 by Emperor William I.

SCHLEGEL (shlā'gel), **August Wilhelm,** eminent critic and poet, born in Hanover, Germany, Sept. 8, 1767; died May 12, 1845. After taking a course in secondary schools, he studied classics and philology at Göttingen, and soon attracted attention as a writer and critic by contributing to various magazines. Later he became lecturer on literature and fine arts at the University of Jena. He was elected to a similar professorship at Berlin in 1802, at Vienna in 1808, and at Bonn in 1818. While at the last named institution he devoted himself largely to the study of Oriental history, made numerous translations from writers of foreign countries into the German language, and lectured on philology and the history of fine arts. He may be classed among the first students of Sanskrit in Germany, and while at Bonn established a Sanskrit printing office and an Indian library. His translations into the German include large parts of the work of Dante, Shakespeare, Cervantes, Camoens, and Calderon. He translated the epic poems of the Sanskrit known as "Rámáyana" and "Marhábhárata, both into the German and Latin. The translation of Shakespeare made by him is still the most classical in the German language. He contributed for several years to Schiller's "Horen," and in connection with his brother published "The Athenäum." Among his other works are "Characters and Critics;" "Spanish Theater;" "Wreaths of Italian, Spanish, and Portuguese Poetry," and "Poetical Works." He was raised to the noble rank in 1818.

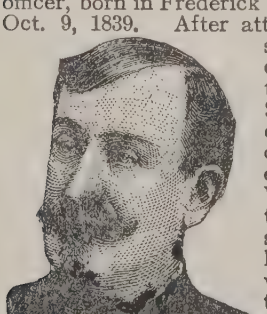
AUGUST W. SCHLEGEL.

SCHLEGEL, Friedrich von, historian and critic, born in Hanover, Germany, March 10, 1772; died in Dresden, Jan. 11, 1829. He was a brother of August Wilhelm Schlegel, studied philology at Göttingen and Leipsic, and entered upon a noted literary career. His first writings were in the form of contributions to journals and periodicals, and in connection with his brother he edited "The Athenäum," a magazine devoted to literary criticism. In 1808 he became councilor of the legation for Austria in the Frankfort diet, serving in that position till 1829, and in the meantime wrote the famous proclamations made by Austria against Napoleon. His writings include "Greeks and Romans;" "History of the Old and New Literature;" "Philosophy of Life;" "Philosophy of Language;" "Collection of Mediæval Romantic Poems;" "Language and Education of the Hindus," and "Lectures on Modern History." His wife was the daughter of Moses Mendelssohn, and assisted him in a number of his writings.

SCHLEICHER (shlī'kēr), **August,** philologist, born at Meiningen, Germany, Feb. 19, 1821; died Dec. 6, 1868. After attending the gymnasium of Coburg, he studied at the universities of Leipsic, Tübingen, and Bonn, and in 1850 became professor of comparative philology in Prague. He lectured there till 1857, when he was made professor of languages in the University of Jena. His writings cover a wide range of philological subjects, both in relation to ancient and modern languages, and many of them have been widely translated. Some writers have classed him next to Franz Bopp (1791-1867) as an authority on philology. Among the best known works are "Languages of Europe;" "History of Languages;" "Hand-Book of the Latin Language;" "Slavonian Languages as Used in Religious Worship," and "Comparative Grammar of the Indo-European Tongues."

SCHLEIERMACHER (shlī'ẹr-mä-kẹr), **Friedrich Ernst Daniel**, eminent theologian, born in Breslau, Germany, Nov. 21, 1768; died Feb. 12, 1834. He first studied in the schools of the Moravian brotherhood at Niesky, where he received marked religious impressions, and in 1787 entered the University of Halle. In 1794 he became a clergyman at Landsberg, but two years later settled at Berlin, where he assisted Friedrich Schlegel in editing "The Athenäum." His first noted work to be published was his "Discourses on Religion," whose publication marks an era in that it directed attention to excessive formalities in religious practice. He became professor of theology and philology at Halle in 1804, but when that university was closed on account of the invasion of the French under Napoleon, in 1806, he returned to Berlin as pastor of the Trinity Church. He was an important factor in placing the University of Berlin on a stable basis, and in 1810 became a professor in that institution, where he lectured on theology and philosophy. In 1817 he acted as president of the Berlin Synod, and devoted the later part of his life to the completion of a number of extensive works on theology. Among the honors extended to him is an election to the Berlin Academy of Sciences in 1811. His writings include "Christmas Festival;" "Concerning the So-called First Epistle of Paul to Timothy;" "Christian Faith According to the Fundamental Propositions of the Evangelical Church;" "Life of Christ," and "Sermons." Schleiermacher was a man of massive understanding and eloquent oratorical power, and is classed by many writers as taking rank next to Luther as a theologian. His views on theology and philosophy have been commented on by such eminent men as Lucke, Neander, Ullman, Strauss, and Bleek.

SCHLEY (shlī), **Winfield Scott**, naval officer, born in Frederick county, Maryland Oct. 9, 1839. After attending the public schools, he took a course of instruction in the United States Naval Academy, and subsequent to graduation entered the Civil War as master on the Potomac. His service brought him in connection with many important events, among them the west gulf blockading and the capture of Port Hudson. Shortly after the close of the war he was assigned to the Pacific squadron, and in 1866-69 was instructor at the United States Naval Academy. In 1884 he commanded the Greely relief ships Bear, Thetis, and Alert, which brought Greely and six others back from Grinnell Land. He was made captain in 1888 and commodore in 1898, and in the latter year took command of the flying squadron at Hampton Roads, which brought him in prominent connection with the blockade of Santiago de Cuba and the destruction of Cervera's fleet on July 3, 1898. Though the American fleet was under the command of William T. Sampson, the signal victory of the Americans is to be attributed largely to Schley, since he commanded in that engagement on account of the absence of the former. For these eminent services he was made rear-admiral. He served as a member of the commission to arrange for the evacuation of Porto Rico by the Spaniards in 1898. Subsequently a controversy arose as to the respective merits of the commanders in the Santiago campaign, known as the Schley-Sampson controversy. It reached its height when Edgar S. Maclay published "History of the United States Navy," in which he charged Schley with disobedience and cowardice. The navy department, at the request of the latter, appointed Admiral Dewey and Rear-Admirals Ramsay and Benham to serve as a court of investigation, with Capt. Samuel C. Lemley as judge advocate. The court made a decision on Dec. 12, 1901, but the verdict was not unanimous. Rear-Admirals Ramsay and Benham censured Rear-Admiral Schley for his conduct in the Santiago campaign but exonerated him from cowardice, while Admiral Dewey made a minority report in which he gave him the honor of the victory. His report concludes in these words: "He (Schley) was in absolute command and is entitled to the credit due to such commanding officer for the glorious victory which resulted in the total destruction of the Spanish ships."



W. S. SCHLEY.

SCHLIEMANN (shlē'mạn), **Heinrich**, eminent archæologist, born at Neubockow, Germany, Jan. 6, 1822; died in Naples, Italy, Dec. 27, 1890. He was the son of a Lutheran pastor, who instructed him from his childhood, and at an early age apprenticed him to a tradesman. This brought him in connection with business men of different countries, and he mastered many modern languages of Europe as well as Greek and Latin. He visited Dutch Guiana in 1842. After returning to Europe he entered a mercantile house at Amsterdam, but subsequently established himself in business at St. Petersburg, where he gained considerable wealth. In 1862 he came to Sacramento, California, and engaged in the banking business until 1866. He went to Asia Minor in 1869 to make excavations on the site of ancient Troy and other notable cities, and in 1874 published "Troy and Its Remains." The Ottoman government required him to pay $10,000 for the treasures he discovered, which are now in the Ethnological Museum at Berlin. He obtained

permission from the government of Greece, in 1876, to excavate on the site of Mycenæ, which led to the discovery of several royal tombs and rich treasures of gold and silver, now deposited in the Polytechnic at Athens. The interesting results of these explorations were published in his work entitled "Researches and Discoveries at Mycenæ." Subsequently he made similar explorations on the island of Ithaca and elsewhere, and published his last two works, entitled "Troja" and "Tiryns."

SCHMALKALDEN (shmäl'käl-dẹn), a town of Germany, in the Prussian province of Hesse-Nassau, thirty miles southwest of Erfurt. It has a considerable local trade, various manufactures, and a population of 7,688. It is a center of interest on account of the League of Schmalkalden, which was drawn up there on April 4, 1531, by nine Protestant princes and eleven imperial cities, to resist aggressive opposition measures promoted by Emperor Charles V. and the Catholic states. Soon after other princes and cities joined the league, and in the time of its greatest strength it included all the Protestant states lying between northern Italy and the Skager Rack. It was first intended to continue the league for six years, but in 1535 an extension for ten years was made, at which time a permanent army was raised to defend the religious and political freedom of the Protestants. A Catholic federation was formed in 1538 in opposition to the Protestant league, but the latter was joined by Francis I., king of France, and Henry VIII. of England declared himself its protector, thus giving the Protestants such strength that Emperor Charles V. found himself unable to contend against it. Mutual jealousy crippled the league. When a battle was ventured at Mühlberg on April 24, 1547, the Protestants were defeated and John Frederick and several other leaders were taken prisoners. However, the objects of the league were accomplished through the diplomacy of Duke Maurice, who, as elector of Saxony, declared war against the emperor and compelled him to grant the treaty of Passau, on July 31, 1552, by which the Protestants secured religious liberty.

SCHNITZER, Eduard. See **Emin Pasha.**

SCHOFIELD (skō'feeld), **John McAllister**, soldier, born in Chautauqua county, New York, Sept. 29, 1831. After graduating from the West Point Military Academy in 1853, he became assistant professor of natural philosophy there, serving from 1855 to 1860. He volunteered his services at the beginning of the Civil War, and was made major of the first Missouri volunteers. He commanded under Gen. Nathaniel Lyon in the battle of Wilson's Creek, in which the latter was killed, and in November, 1861, he was made brigadier-general, commanding the Missouri militia and the army of the frontier. In 1864 he was given command of the army of the Ohio, and accompanied Sherman on his southern campaign, taking part in the capture of Atlanta. Soon after he defeated Hood at Franklin, Tenn., took part in the battle of Nashville, and in 1865 was sent with his corps to North Carolina, capturing Wilmington and Kingston, and in March joined Sherman at Goldsboro. He drew up the articles for the surrender of General Johnston, and in 1866-68 had command of the Virginia military district. In 1868 he succeeded Edwin M. Stanton as secretary of war, but resigned the following year to become major-general of the United States army. He was superintendent of the military academy at West Point in 1876-81, and in 1888 succeeded General Sheridan as general-in-chief of the United States army with headquarters at Washington. President Cleveland appointed him lieutenant-general in February, 1895, but he was retired in September of the same year.

SCHOLASTICISM (skō-lăs'tĭ-sĭz'm), the name of a movement that began with the opening of cloister schools by Charlemagne for the education of the clergy. It was both philosophical and theological in its character, and though confined to no one school, it was marked by its teaching of classical logic and philosophy as applied to theology. The philosophers identified with it were known as scholastics or schoolmen. The exact time of its origin cannot be clearly stated, and there is a vast difference in the scholastic philosophy of different periods, but the time of mediæval scholasticism is generally assigned to the period beginning with 1000 and ending with 1500. It may be said that the scholastics aimed to reduce church doctrines to a scientific system. Their basic assumption was that the church creed is absolutely true, and when they found a discrepancy between ancient philosophy and ecclesiastical discipline, they accommodated the former to the latter. It may be considered that scholasticism had two chief epochs. The first began with John Scotus Erigena in the 9th century and extended to the beginning of the 13th century, in which the Aristotelian logic and Neo-Platonic philosophemes were accommodated to the doctrines of the church. Among the representative names of this epoch are those of Berengarius of Tours, Pope Sylvester II., Anselm, archbishop of Canterbury, and John of Salisbury. It was a period of contention between the Nominalists and Realists, which terminated in the triumph of the latter, and it therefore became the prevailing mode of thought in philosophy during the golden age of scholasticism, in the 12th and 13th centuries.

The second epoch extends from the 13th to the 15th century, ending with the Renaissance and the Reformation. It witnessed the adaptation of the whole Aristotelian philosophy to theology. Alexander of Hales (died 1245) was perhaps the first scholastic

who was acquainted with all the works of Aristotle and the Arabian commentaries on the same, but after his time many others of wide study succeeded in molding thought from the standpoint of a larger view. In this period rose the Scotists and the Thomists; the former being represented by the Franciscans, and the latter by the Dominicans, and the quarrels that resulted greatly curbed the influence of scholasticism. It finally laid down the remarkable proposition that a thing might be philosophically true and theologically false, and vice versa. With the revival of letters and the Reformation study began to turn away from the formalities of old philosophies and dead languages as a primary object of investigation, and instead directed its energy to the sciences and human nature. Teachers began to study and observe pupils, to investigate the laws governing physical and spiritual growth, and to proceed according to the newer and better methods.

SCHOOLCRAFT, Henry Rowe, traveler and author, born in Albany county, New York, March 28, 1793; died Dec. 10, 1864. He studied at Union and Middleburg colleges, and passed many years as Indian agent for the government in the region of the Great Lakes. In 1823 he married the granddaughter of an Ojibway chief, a lady who had been educated in Europe, and made his headquarters at Mackinaw. His connection with the Indians enabled him to learn the languages of a number of the different tribes, and to study their ethnology and antiquities. He served as a member of the territorial legislature of Michigan in 1828-32, within which period he founded the Historical Society of Michigan. He commanded an expedition to the region of the Upper Mississippi in 1832, when he discovered and explored its source.

In 1832 the government authorized Schoolcraft to negotiate a treaty with the Indians, which resulted in the purchase of 16,000,000 acres of land in the vicinity of northern Minnesota. He was appointed soon after to act as superintendent of Indian affairs in the department of the North. Congress authorized him to gather material for an authentic treatise regarding North American Indians, appropriating a large sum of money for that purpose. He published statistics and miscellaneous information of the Six Nations in 1847, and from time to time added additional volumes, the sixth of the series appearing in 1857. The title of this work is "Historical and Classical Information Respecting the History, Condition, and Prospects of the Indian Tribes of the United States." Other works from his pen include "Indian in his Wigwam;" "Thirty Years with the Indian Tribes of the Northwestern Frontier;" "Myth of Hiawatha and Other Legends;" "Notes on the Iroquois;" "Red Race of America," and "Lectures on the Indian Languages."

SCHOOLS, the institutions maintained for giving instruction in arts, sciences, languages, or any other branches of learning. Schools in the widest sense include all establishments for systematic instruction of any kind or grade, from the kindergarten to the university, whether of a private or public character. Education in the earliest periods was mainly domestic, being conducted by the parents, and its character was largely religious. Writers generally agree that public schools existed in the time of Babylonia, and that they were introduced among the Hebrews shortly after the return from Babylonian captivity. The ancient Greeks maintained public educational institutions for the training of the young, not only in elementary branches, but in industrial arts, sciences, and languages. Schools of a like character were maintained by the Romans. In the Middle Ages educational institutions sprang into existence in many parts of western Europe, but the schools were for centuries largely in the hands of the clergy and comparatively few of the laymen acquired ability to read and write. This condition was favored by the extended discussion of the scholastics in relation to hair-splitting theories of ancient philosophy and ecclesiastical discipline.

This condition continued unchanged until the revival of letters, when thought began to be directed toward the investigation of natural sciences and the organization of schools well calculated to train the child from infancy, according to recognized and salutary methods of instruction. In this period two great classes formed, the one holding that it is the duty of the state to supervise the education of the child from its first attendance at school until at least the elementary branches are mastered successfully, while the other class held the view that instruction should be under the guidance of the church. However, both classes became impressed with the need of making instruction more nearly fitted for the wholesome and progressive development of youth, being in this respect influenced by the eminent teachers of western Europe, including Pestalozzi, Fröebel, Herbart, Rousseau, Rosenkranz, Ratich, Richter, Schlegel, and many others. Instead of making instruction conform to the dead formalities of ancient philosophies, these teachers directed attention to the laws of mind growth and development, and brought the child and teacher in contact with the living and vitalizing influences of nature and first principles.

The two parties advocating private and public education are still represented in large numbers, both in America and Europe. The term private education implies the instruction given by tutors or in schools other than those supported by the state, including the schools maintained by various religious denominations, societies, and numerous other organizations. These schools in some places

have come in conflict with public schools, since the withdrawal of a part of the children from the latter has decreased their enrollment, and they have obliged those patronizing private schools to pay double support—taxes to the public schools and voluntary appropriations to the private. In some countries private schools receive partial support from the state, but in the United States no such aid is given, and all the parochial and other private schools are maintained voluntarily. Advocates of private schools maintain them for two principal reasons, one being that religious instruction of a definite character is excluded from the public schools, and the other that private schools offer to the parent just such branches of study and forms of instruction as are wanted for the child. Advocates of public schools are of the general opinion that the child should be trained with a special view of fitting him for citizenship, and to accomplish this to the best purpose they think it necessary that the state prescribe a course of study and require attendance until at least the elementary branches have been completed successfully. While all advocate the highest form of moral instruction, they regard it possible to give a sufficient amount of religious or sectarian training in Sunday schools and churches, and during the period of vacation.

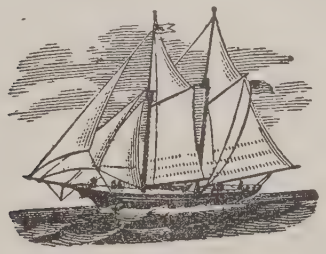
It is generally admitted that the first public and free school in America was founded by the Dutch in New York, but others were established soon after, the earliest in Massachusetts dating from 1635. The remark made by Governor Berkeley, in 1670, that he thanked God that there were no free schools in Virginia, is often quoted as an evidence that a free and intelligent people are not easily suppressed by tyrants. The public schools of the United States are not organized on a national basis; but they are under the direct control and supervision of the states. In this respect they are like those of Germany. Congress has given aid to the establishment and maintenance of various institutions of learning by the reservation of public lands and by making appropriations for special purposes. The total amount of land appropriated is 78,889,839 acres. Of this land granted for educational purposes 67,892,919 acres were appropriated to aid common schools; 9,600,000 acres to aid mechanical and agricultural schools; and 1,395,920 acres to support universities. A national commissioner of education is maintained to conduct the bureau of education, whose object is to gather statistics of general interest and to give aid by publishing and otherwise disseminating educational intelligence.

It may be said that there are as many educational systems as there are states, but they are similar in many respects. In most of the states the schools are under a state superintendent, or an officer having similar executive duties. He is aided in the work of superintendence in most states by county superintendents or similar officers, who have general supervision of the common schools in their respective counties. City superintendents are provided for by boards of directors in the larger cities and principals in the towns. In some states supervisory officers have charge of the schools in the townships. Revenues to maintain the schools are derived from various sources, of which the principal ones are state school taxes, local taxes, and permanent school endowments. All these are utilized in most of the states, and in addition there are other sources of revenue, such as license taxes, fines, and penalties, and in some states poll taxes. The common schools give instruction in the common branches of education, corresponding to the elementary schools of England and the volks-schulen of Germany. In some states common schools are the only educational advantages provided in rural districts, but others have township or county high schools. Towns and cities maintain both elementary and high schools, and in many of the larger cities are kindergarten and special schools of various kinds. In others the same results are obtained by the employment of special teachers in the public and private schools.

Universities and colleges are maintained by all the states, the revenues being secured under state taxation. Normal schools for the professional training of teachers are supported by state taxation, and in most cases a small contingent fee is charged those who attend. Some states maintain a number of normal schools, while in others only one is supported, but in such cases provisions are made for normal instruction to be given in various high schools. Teachers' institutes are inspirational schools with a short course of study. They are designed to inspire educationally and professionally the teachers already in the work and those intending to become teachers. Practically all the states have made ample provision for the training of incorrigible children, and for the care of the criminal, defective, and dependent classes. Manual training schools and other institutions with special courses are maintained in some states. Laws requiring attendance for a limited period have been enacted in some states, as in Massachusetts, where the period for school attendance is fixed by law from the age of eight to fourteen years. The prohibition of child labor in mines and factories has greatly facilitated educational advancement, and friends of education generally look upon this as wholesome for both private and public schools. The lowest per cent. of illiteracy in the United States is in the states of the central west. See **Education**.

SCHOONER (skōōn'ẽr), a sailing vessel with two or three masts. Vessels of this class are built for fast sailing and are pro-

vided with fore-and-aft sails. Many different kinds of schooners are employed, but the two chief classes are those known as fore-and-aft rigged and the topsail schooner.



SCHOONER.

The former are provided with fore-and-aft sails on two masts, and vessels of the latter class carry a square topsail and topgallant-sail. Schooners provided with three masts carry fore-and-aft sails on each mast.

SCHOPENHAUER (sho'pen-how-ẹr), **Arthur,** eminent philosopher, born in Dantzic, Germany, Feb. 22, 1788; died Sept. 21, 1860. He was a son of Johanna Schopenhauer (1770-1838), an authoress. After securing a secondary education in his native city, he was trained under the direction of his father for a business career. However, he became interested in literature and entered the University of Göttingen, but later studied at the universities of Berlin and Jena, graduating from the latter in 1813. His university study brought him in contact with the lectures of Fichte and Schleiermacher, who induced in him a love of philosophy. At the time of his graduation he presented an essay that contains the basis of his system, entitled "Fourfold Root of the Principle of Sufficient Reason." He lived with his mother at Weimar in 1814-18, where he enjoyed the society of Goethe and other men of high culture. Shortly after he settled at Dresden, and published a work entitled "Sight and Color." In the same year he made a visit to Rome and Naples, and spent his time in Italy from 1822 to 1825. In 1831 he settled at Frankfort-on-the-Main, where he devoted himself to literary research and the development of his system of philosophy.

The fundamental doctrine of Schopenhauer is that will is the only essential reality in the universe. According to it the phenomenon we call appearances exist only in subjective representations, and constitute mere forms under which will is shown. He asserts that will is not necessarily accompanied by self-consciousness, but it strives to attain that end. In this he opposes the doctrines announced by Fichte, Hegel, and Schelling, who regard consciousness as a necessary basis of thought. Schopenhauer advocated a form of ethics based on a thoroughly pessimistic theory of existence, its ideal being the negation of the will to live. He led a solitary life, had few intimate friends, and through an apparently natural disposition to despise women he never married. In several of his writings he made attacks upon a number of philosophers differing from him, but his works attracted little attention until many years after his death. At present his views have a wide influence on philosophical speculation. His writings embrace "World Considered as Will and Idea;" "Freedom of the Will;" "Will in Nature;" "Fundamentals of Morality," and "The Two Basic Problems of Ethics."

SCHUBERT (shoo'bẹrt), **Franz Peter,** eminent German musical composer, born in Vienna, Austria, Jan. 31, 1797; died Nov. 19, 1828. His father was a schoolmaster in Leopoldstadt, and began to give him instruction in music at the age of seven years. His voice attained such culture and beauty that it attracted sufficient attention to admit him into the choir of the imperial chapel in 1808. The succeeding five years he studied the violin, and received training in singing at a school called the Convict, but a temporary failure of his voice caused him to leave that institution in 1813. Subsequently he was taught for three years in the school of his father. He soon turned his talent to profitable use by teaching music and composing. Schubert was early skilled on the piano and many other musical instruments, and by 1815 composed five operas, two symphonies, and 137 songs. In the meantime his father became teacher at Lichtenthal, where he attended until reaching the age of eighteen years.

FRANZ P. SCHUBERT.

In 1819 the musical friends of Schubert secured the presentation of his song "Shepherd's Lament" at a concert in Vienna, and his comic operetta "The Twins," thereby bringing his productions to public notice. From that time he was aided financially by a large sale of his productions, and in 1825 made a tour of Austria and Germany, meeting everywhere with enthusiastic receptions. Schubert was not only an able and tireless writer of music, but produced compositions with such rapidity that he astonished even his friends. It appeared that he could not refrain from writing when his genius became inspired with an idea. His entire compositions include six masses, ten symphonies, fifteen operas, and 600 songs. His "Seventh Symphony" is regarded the most beautiful, and ranks with those of Beethoven. Other productions that would alone entitle him to

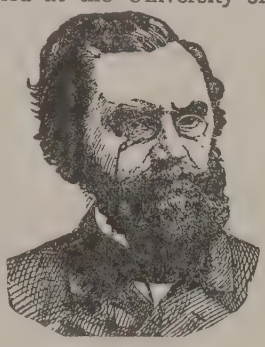
high repute include "Hark, Hark, the Lark;" "Rosamond;" "Enchanted Harp," and "Fierabras." The principal collections of his songs include "Müllerlieder;" "Winterreise," and "Schwanengesang." He edited the famous periodical, "New Magazine of Music," in 1834-44. His death at the early age of thirty-two years was brought on by excessive work, terminating in a sudden delirium on October 13, from which he never recovered.

SCHUMANN (shoo'män), **Robert**, musical critic and composer, born in Zwickau, Germany, June 8, 1810; died near Bonn, July 29, 1856. He first studied law at the University of Heidelberg, but his ambition to excel as a pianist induced him to devote himself to music. After studying for some time, he sustained a permanent disablement of one of his fingers whereby he was compelled to devote himself exclusively to the composition of music. In 1840 he married Clara Wieck (1819-1896), daughter of Friedrich Wieck, one of the most eminent pianists of that period. He established the "New Magazine of Music" in 1834, with which he was connected ten years, and made it an important influence in developing musical art and bringing his productions to public notice. Few composers labored with greater devotion to add substantially to the finer musical productions, many of his compositions being of the highest class, notably the cantata "Paradise and the Peri," and his great orchestral work, entitled "Symphony in B."

ROBERT SCHUMANN.

Mendelssohn had located in Leipsic in 1835, where he and Schumann lived upon the warmest terms of friendship. Their numerous productions made that city the musical center of Germany. Schumann was made professor of composition in the conservatory of music founded at Leipsic by Mendelssohn in 1843, and in 1850 became musical director at Düsseldorf, a position he retained till 1853. His mind became clouded in the latter year, and he was soon after confined to a hospital near Bonn, where his death occurred. The musical compositions of Schumann include a number of symphonies, cantatas, concertos, and orchestral works. He contributed largely to the literature of art, being the author of a number of valuable essays and criticisms. Among his works not named above are "Scenes of Childhood;" "Kriesleriana;" "Carnival;" "Papillons;" "Etudes Symphoniques Fantasias;" "Overture Scherzo;" "Genevieve;" "Finale," and "Manfred." His wife made his music highly popular in Europe by playing with marked success in many of the leading cities, and before her death he attained a rank among the greatest composers. He was one of the leading representatives of the Romantic school.

SCHURZ (shoorts), **Carl**, statesman and journalist, born in Liblar, Germany, March 2, 1829. He studied at the University of Bonn till 1848, and the following year took part in the Revolution. After engaging in the unsuccessful defense of Rastadt, a fortified town of Baden, he was compelled to flee to Switzerland. He removed to the United States in 1852, residing first at Philadelphia, but later settled in Watertown, Wisconsin. He established a successful law practice at Milwaukee in 1859, where he became prominent as a leader among the Germans, and was closely identified with the organization of the republican party. In 1860 he gave active support to Lincoln, who appointed him United States minister to Spain in 1861, but he soon after resigned to enter the army. He was made brigadier-general of volunteers in 1862, and the following year major-general, commanding in the second battle of Bull Run, Chancellorsville, Gettysburg, and Chattanooga.



CARL SCHURZ.

Schurz settled in St. Louis soon after the war, and in 1869 was made United States senator. In 1872 he supported Horace Greeley for president, removed to New York in 1875, and in 1876 made an active canvass for Rutherford B. Hayes, who selected him as secretary of the interior. He edited the "New York Evening Post" in 1881-83, and the following year actively supported President Cleveland on the issue of civil service reform. In 1896 he made an active campaign for President McKinley on the issue of a single gold standard, and in 1900 supported W. J. Bryan on account of his opposition to the war policy of the republican party. Schurz ranks as one of the most influential speakers and writers of the United States. He is noted particularly for his independence in political discussions. He wrote one of the best biographies published of Henry Clay. His noted speeches include "Abolition of Slavery as a War Measure;" "Irrepressible Conflict," and "Eulogy on Charles Sumner."

SCHUYLER (skī'lẹr), **Philip John**, soldier, born in Albany, New York, Nov. 22, 1733; died there Nov. 18, 1804. His father left to him a large estate, much of which he

turned to good account in aiding the American colonies. In 1755-58 he served in the British army against the French, and was promoted to the rank of major. He sat as a delegate in the continental congress at Philadelphia in 1775, and was made one of the four major-generals first appointed to serve in the Revolutionary army. He first proceeded to Ticonderoga with the design of invading Canada, but poor health obliged him to return to Albany and give up his command to General Montgomery, but there discharged the duties of commissary-general. After serving as a representative in congress in 1777, he became chief of military in Pennsylvania, and subsequently was given command of the northern department. He was present when Burgoyne surrendered at Saratoga, assisting General Gates in making necessary arrangements, but in 1779 resigned his command and served as a member of congress. Schuyler was not only a trusted friend and adviser of Washington, but aided the public treasury by making advances from his private resources. He was elected United States senator from New York in 1789, and again in 1797. As a member of the New York legislature he contributed largely to the code of laws, and aided in promoting the canal system in the state. His influence in politics was with the federal party.

SCHUYLKILL (skōōl'kĭll), a river in Pennsylvania, the largest tributary of the Delaware. It rises in Schuylkill county, near Pottsville, and after a course of 130 miles toward the southeast, enters the Delaware at Philadelphia. The Schuylkill flows through a rich mining and agricultural country, supplies excellent water power, and is one of the most beautiful features of Fairmount Park, Philadelphia. It furnishes that city its water supply, and is navigated by canal boats, by means of dams and locks, to the coal region in Schuylkill county. Among the thriving cities on its banks are Philadelphia, Phœnixville, Reading, Norristown, and Pottsville.

SCHWATKA (shwŏt'ka), **Frederick**, Arctic explorer, born in Galena, Illinois, Sept. 29, 1849; died in Portland, Oregon, Nov. 2, 1892. He graduated from the West Point Military Academy in 1871, and till 1877 served as lieutenant of cavalry. In the meantime he was admitted to the Nebraska bar and secured a medical degree in New York. He was made commander of an expedition to King William's Land in 1878. His company discovered the remains of Sir John Franklin's party and secured information of value regarding its adventures. After many hardships and a sledge journey of 3,250 miles, the party returned to the United States in 1880. In 1884 he explored the course of the Yukon in Alaska, and had charge of an expedition sent by the "New York Times" into Alaska in 1886, when he ascended Mount St. Elias to a height of 7,200 feet. In 1889 he conducted an expedition to study the remains of cliff and cave dwellers and of the Aztecs in Mexico, and in 1891 made another expedition to Alaska. Among the honors bestowed upon him are medals from the Imperial Geographical Society of Russia and the Geographical Society of Paris. He wrote "Nimrod of the North;" "Along Alaska's Great River," and "Children of the Cold."

SCHWEINFURTH (shwīn'fo͝ort), **Georg August**, German explorer and naturalist, born in Riga, Russia, Dec. 29, 1836. He first studied at Riga, but later at Heidelberg, and conducted scientific excursions to study botany in France, Russia, and Italy. Between 1864-71 he made three tours to Egypt, where he studied the flora and fauna of the Nile basin. He made extended explorations of the oases in the Libyan desert in 1873-74, and in the latter year was appointed by the khedive of Egypt as director of the Cairo Museum of Natural History. In 1876-78 he made explorations of the region between the Red Sea and the Nile, explored the island of Scotia in 1881, and subsequently promoted German colonization in the equatorial regions of Africa. Many valuable collections of natural history were sent by him to the National Museum of Germany. His writings include "In the Heart of Africa;" "Flora of Ethiopia," and "Plants and Plant Life."

SCHWERIN (shwâ-rēn'), a city of Germany, capital of Mecklenburg-Schwerin, sixty miles east of Hamburg. It is beautifully located on Schweriner Lake, a body of water fourteen miles long and three miles wide. The city has railroad conveniences, excellent schools, and manufactures of tobacco products, earthenware, carriages, cotton and woolen goods, and machinery. It is the seat of a fine Gothic cathedral founded in 1248, and near it is a ducal castle erected by Wallenstein. In front of the theater is a statue of Rauch. Population, 38,670.

SCIENCE, the sum of universal knowledge. In a more limited sense the term is applied to any department of knowledge gained and verified by exact observation and correct thinking. According to the former definition it resembles philosophy, which deals with the whole sum of knowledge; but as limited by the latter it deals with a particular department of knowledge concerning some subject or group of subjects. In the beginning of study it was necessary to collect and observe facts, then to form them into a system and reduce the generalizations to laws, and finally to proceed to some principle accounting for these laws. It is clearly shown by history that many laws long accepted were overthrown by subsequent investigation, but in the course of time it became possible to demonstrate the truth of certain basic principles that are now accepted generally. The five divisions of

science include the mathematical, treating of quantity; the physical, treating of matter and its properties; biological, treating of the phenomena of life; anthropological, treating of the phenomena of mankind; and theological, treating of the deity.

Another classification of the sciences divides them into applied or practical sciences, and pure or theoretic sciences. The former include those that treat of the knowledge of facts or events accounted for or produced by definite laws; and the latter embrace the knowledge of these laws as considered apart from all application. Pure or fundamental sciences include mathematics, psychology, physics, sociology, and chemistry; and the applied or concrete embrace botany, meteorology, mineralogy, geology, geography, zoölogy, law, ethics, politics, grammar, jurisprudence, rhetoric, logic, philology, engineering, economics, surgery, medicine, and many others. The development of the sciences may be traced through different stages of evolution, the initial periods being found in remote antiquity. Man's desire to ascertain his proper conduct toward his fellows and his Creator caused moral science, a department of mental science, to be the first to attain some degree of maturity. The next to receive attention was mental science, or the study dealing with the power to think, feel, and will; but in the latter slow progress was made, and as a result psychology as a branch of knowledge is in its conclusions still far from certainty. Many of the myths of the ancients were hypotheses connected with natural phenomena, and in them may be found the beginning of physical sciences. Progress in the physical sciences was slow until the beginning of the 18th century, when they began to develop with remarkable rapidity, and knowledge connected with them surpassed the advances made in astronomy, physics, chemistry, and botany, though all these had received attention long before. Little study was given to geology before the 19th century, while anthropology, comparative religions and other allied sciences are materially newer.

No one can be a successful student of science unless he considers truth of prime importance, and is willing to sacrifice preconceived notions whenever he discovers new truths to render the formerly accepted views erroneous. The expenditure of money, time, or even life is not considered useless if the student adds fresh truth, or even paves the way for the addition of valuable discoveries. There is no limit to the field of discovery, though at times men have thought that human ability to add to knowledge had been exhausted. However, modern discoveries have led to the conclusion that there are still fields as productive as ever confronting the seeker for scientific extension. This is evidenced by turning to practical account through scientific inquiry such resources as culminated in the application of telegraphy, steam, electricity, and many others of vast importance.

SCILLY (sĭl'ĭ), an island group belonging to the British Isles, situated twenty-eight miles southwest of Land's End, England. The group includes about thirty-five islands, but only six possess any importance, the others being formed largely of rocks. These islands belong to and form a part of Cornwall county. St. Mary's Island is the largest, having an area of 1,528 acres, with a population of 1,400, while the population of the entire group is 3,465. The climate is moist and variable, and the principal products are vegetables and spring flowers, which are transported to the London market. There are deposits of tin and granite, and fisheries of considerable value. The islands were conquered by Athelstan in 938 and granted to some monks, who formed settlements on the island of Tresco. Sir Francis Godolphin secured a lease of them from Queen Elizabeth, and they remained in possession of his family for 250 years, but are now the property of the crown.

SCIO (sī'ō), an island in the Ægean Sea, seven miles off the coast of Asia Minor, and fifty-two miles west of Smyrna. It is thirty-two miles long, seventeen miles wide, and has an area of 400 square miles. The climate is favorable. Among the chief productions are silk, cotton, wine, gum-mastic, cereals, and many varieties of fruits. Horses, cattle, swine, and sheep are grown. It has valuable fisheries, and manufactures of silk and woolen goods, confectionery, carpets, and clothing. Formerly the island was populated entirely by Greeks, but in 1822 the Sciotes joined the revolution against Turkey and many of them were massacred. Scio holds a prominent place in ancient history, and contends for the honor of being the birthplace of Homer. Kastro, population 18,975, is the capital. Population of the island, 71,500.

SCIOTO RIVER (sī-ō'tō), a northern tributary of the Ohio, which rises in Auglaize county, western Ohio, and after a course of 285 miles toward the east and south, flows into the Ohio River at Portsmouth. The Scioto valley is fertile, producing large quantities of cereals, fruits, and live-stock. The river is navigable during high water about 130 miles from the mouth, and is of importance in connection with the Ohio and Erie Canal. Its chief tributaries are the Whetstone and Derby.

SCIPIO (sĭp'ĭ-o), **Publius Cornelius**, called Africanus Major, eminent Roman soldier, born about 234 B. C.; died 183 B. C. The first mention of him is made in connection with the battle of the Ticinus in 218 B. C., where he saved the life of his father, Publius Cornelius Scipio, who was the first Roman general to encounter Hannibal in battle. Soon after he was made military tribune, and in 216 B. C. took part in the

battle at Cannæ, from which disastrous field he escaped to collect the remains of the Roman army and save the capital. In 212 B. C. he became ædile, though still under age, and in the following year was appointed proconsul of the Roman army in Spain. His successful campaign began with the defeat of the Carthaginians at New Carthage, and the capture of other cities followed in rapid succession. He defeated Hasdrubal, brother of Hannibal, in 209 B. C., and soon after drove the Carthaginian army entirely from Spain.

Scipio was commissioned to carry the war into Africa, but Hannibal was recalled from Italy to meet him in battle at Zama, where he defeated the Carthaginians on Oct. 19, 202 B. C., and thus ended the struggle for Roman supremacy over Carthage. On returning to Rome he was given a magnificent triumph, received the surname of Africanus, and was offered the dictatorship for life, but declined. Soon after he was sent against Antiochus, king of Syria, and when the war against that monarch terminated successfully in 189 B. C., he retired to private life. Two years later his brother, Lucius, was prosecuted for receiving bribes from Antiochus while in Syria, and later Scipio was charged with being implicated, but the senate ended the prosecution on the anniversary of the great battle of Zama. Scipio was counted the ablest general of Rome before the time of Julius Cæsar, and is described as a man of remarkable bravery, courtesy, and pious faith in the gods. Cornelia, his daughter, was the mother of the Gracchi. His death occurred at Campania, his country home, it is believed the same year in which his great opponent, Hannibal, died.

SCIPIO, Publius Cornelius, called Africanus Minor, Roman soldier, born in 185 B. C.; died in 129 B. C. He was the son of the great conqueror of Macedon, Lucius Æmilius Paulus, and became adopted by Publius Scipio, son of Scipio Africanus Major. He was with his father at the decisive battle of Pydna, in Macedon, in 168 B. C., and while in Greece formed a lasting friendship with Polybius, the historian. In 151 B. C. he was sent as military tribune to Spain, and at the beginning of the Third Punic War, in 149 B. C., led a Roman army to Africa, where he began the siege of Carthage. The senate made him consul in 147 B. C., though not of legal age, and he thus became the leader of the army against the Carthaginians, in which capacity he stormed Carthage the following year. The ruin and complete destruction of that city were regretted sincerely by him.

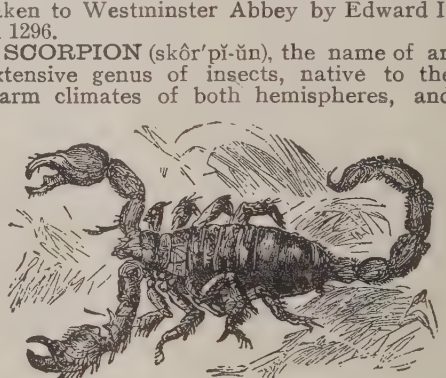
It is said that as Scipio beheld the destruction wrought by the army in Carthage, he thought of the future fate of Rome, uttering at the same time the words of the "Iliad:"

"The day shall come when sacred Troy shall perish,
And Priam and his people shall be slain."

On returning to Rome, he was honored with a triumph, and was surnamed Africanus. He became censor in 142 B. C., ambassador to Egypt and Asia in 139 B. C., and was reëlected consul in 134 B. C. In the latter year he was sent to Spain, where he conquered Numantia after a siege of eight months, and destroyed and sacked the city. His political life at home was not highly successful, since he created much opposition by opposing the agrarian law of Tiberius Gracchus, and generally sympathized with the leaders of the aristocratic party. It is thought that his death resulted from violence by instigation of leaders opposed to him politically, for the reason that he was found dead in his bed.

SCONE (skōōn), a town of Scotland, on the Tay River, two miles north of Perth. It is celebrated for its monastery, first mentioned in the early part of the 10th century, in which the kings of Scotland from 1153 until 1458 were crowned. It contained the famous Stone of Destiny on which the kings of Scotland were inaugurated, which was taken to Westminster Abbey by Edward I. in 1296.

SCORPION (skôr'pĭ-ŭn), the name of an extensive genus of insects, native to the warm climates of both hemispheres, and



SCORPION.

belonging to the same family as the spiders. The body is elongated, usually from two to six inches, and somewhat resembles that of small lobsters in shape. They have a long, narrow, flexible tail, which is capable of being curved over the back and terminates in a poisonous sting. There are six broad segments in the abdomen, and six narrow ones in the tail. The sting consists of a curved and sharp modification of the last segment. They are provided with six, eight, or twelve eyes, and have eight legs and two large claws resembling those of the lobster. The scorpions frequent dark places during the day, usually seeking shelter under stones, but at night come out in search of food. It is not uncommon to find them in hiding under pillows, boots, and other objects in warm climates, where they are disliked and dreaded. Their sting, though painful and poisonous, is not usually, if ever, fatal to man. Scorpions are found in abundance in southern Asia and Europe,

northern Africa, Australia, and the tropical parts of America. The black scorpion has a body about six inches long. Its sting is very poisonous. Several small species are native to the southern United States. The so-called rock-scorpion is a familiar kind. Another group of insects allied to them is the book-scorpions, but they are smaller, and do not possess the jointed tail common to the true scorpions. They live in or among books, where they subsist on minute insects that frequent such places. The true scorpions feed on spiders and insects. From thirty to sixty young are brought forth from eggs at a time, and are carried on the back of the mother during early life.

SCOTLAND, a division of the British Empire, situated north of England, from which it is separated by the Cheviot Hills, the Tweed River, and the Solway Firth. All the remainder of its boundary is formed by the Atlantic Ocean, which extends into its shores by numerous indentations of such extent that practically all parts are within forty miles from the sea. Its length from north to south is 285 miles, width from twenty-five to 145 miles, area 30,375 square miles, and population 4,471,957. Its extensive coast indentations give it about 3,000 miles of coast line, including the important indentations of Firth of Forth, Firth of Tay, Moray Firth, and Dornoch Firth on the east; and the Firth of Lorn, Firth of Clyde, and Solway Firth on the west. Between it and Ireland extends the North Channel. About 800 islands are adjacent to its shores, of which the Orkney and Hebrides are the largest groups. There are numerous small islands distributed along the western coast, of which the principal ones are Arran, the Cumbraes, and Bute. The islands stretching along the coast from Islay to Skye are known as the Inner Hebrides, and are separated from the Outer Hebrides by the straits of Minch and Little Minch.

The climate of Scotland resembles that of England, but it is somewhat colder, owing to its location farther north and to its surface being somewhat higher. However, the thermometer rarely falls to zero in winter and the summer heat is seldom above 80°. Three natural divisions characterize the surface; these are the southern uplands, the central lowlands, and the highlands of the north. The Grampian Hills form the larger part of the highlands, including summits that rise somewhat more than 4,000 feet above sea-level, of which Ben Nevis, 4,406 feet, is the culminating peak. South of the Grampians are the central lowlands, which stretch from the Firth of Clyde to the Firth of Tay, and include many beautiful lakes and streams, connected largely by important canals, among them the Caledonian Canal from the west to the east coast. The southern uplands are formed largely by the Cheviot Hills, from which ranges stretch toward the north, culminating in peaks about 3,000 feet above sea-level.

Among the principal streams of Scotland are the Tweed, Clyde, Nith, Tay, Earn, Dee, Spey, Findhorn, and Doveran rivers. Most of the streams are valuable for the production of salmon and other fish, and the lower courses of many are important for their navigation facilities. Loch Lomond, area twenty-eight square miles, is the most important of the lakes, but there are many others in the interior, among them Tay, Earn, Shiel, Rannoch, and Awe lakes. Scotland has valuable deposits of coal, iron, granite, lead, sandstone, and limestone. The highlands are rich in timber, where beautiful valleys, glens, and scenery are abundant. The shores are frequented by many varieties of birds. Valuable fisheries of cod, herring, ling, and other species are abundant. The manufactures have kept pace with those of England both in quality and quantity. They include cotton textiles, silk and woolen goods, leather, soap, sailing vessels, hardware, machinery, and clothing. Agriculture is an extensive and well developed industry, every portion of the soil being utilized for some purpose, and the trade is closely identified with that of Great Britain.

The early history of Scotland is wrapped in obscurity and tradition, and the first definite information regarding its people dates from the time when Britain was occupied by the Romans. It appears that the early inhabitants were non-Aryan, closely resembling the Iberians. Later the Scoti or Scots invaded the country from Ireland, forming settlements in the northern part of England and the southern part of Scotland. The descendants from the original inhabitants became known as Picts, but they were called Caledonians by the Romans, and the country Caledonia. The Picts were most numerous in the latter part of the 5th century, and with the colonization of the Scots, a Celtic people, a long line of controversies arose between these two predominating classes. In the 4th century a large Teutonic element from the north of Germany formed colonies near the Firth of Forth, which finally resulted in annexing the region south to the kingdom of Northumbria, whose boundaries extended from the Forth to the Humber River. In the meantime the Norsemen were establishing themselves on the Orkney and Hebrides islands.

The Picts and Scots were united into one kingdom under Kenneth MacAlpin, a Scottish ruler of Pictish descent, in the 9th century, and soon after the country became known as Scotland. Thirty-eight Pictish kings appear to have reigned and are mentioned in the history of Scotland, but in the latter part of the 9th century the Scots became the predominating influence and slowly united the independent chiefs in the north of Scotland to their dominion. Subsequently followed a long period of wars

against the Norsemen on the north and the Britons and Saxons on the south. In 937 the Scottish king, Constantine, aided the Danes in a battle against the Saxon king, Athelstan, this being the first battle of importance fought on English soil. Malcolm I. (943-954) conducted a successful war against Edmund I. of England, which resulted in Cumbria being annexed to Scotland, and in 1018 Lothian, formerly a part of Northumbria, was annexed to England by Edmund II. The three succeeding kings of Scotland are Malcolm II., Duncan, and Macbeth, whose history is made a part of the tragedy of Shakespeare. Malcom III. ascended the throne in 1057, after defeating the usurper Macbeth at Lumphanan, and with his reign commenced a social and political revolution in Scotland. He married the English princess, Margaret, sister of Edgar Atheling of England, and thus the English language and customs were introduced.

At that time occurred the conquest of England by William the Conqueror, which was followed by a large number of Saxons leaving England and forming settlements in Scotland. Many serious struggles took place between Malcolm and the Norman invaders of England. He made two successful invasions of England, but William soon collected a large army and invaded Scotland, which resulted in a loss of territory to the former, and Malcolm and his eldest son were slain in 1093 while attempting to seize Alnwick Castle. Malcolm was succeeded by his three sons, Edgar, Alexander, and David. Of these David was the most successful. He reigned in 1124-53, devoting himself earnestly to internal improvements and the spread of the Christian religion. When he ascended the throne Scotland had only a primitive civilization, but he founded schools, introduced a system of written laws, organized a representative legislature, and established the manners and language of the Teutonic race. He was succeeded by Malcolm IV. (1153-65), in whose reign Cumberland and Northumberland were annexed to England. The latter was succeeded by William the Lion, who was taken prisoner in 1175 while attempting to regain Northumberland, and Scotland was declared dependent on England.

Scottish independence was restored in 1189 by Richard I., and at the death of William, in 1214, Alexander II. (1214-1249) succeeded to the throne. He was succeeded by his son Alexander III. (1249-1286), whose reign gave importance and prosperity to Scotland, but his sudden death brought on the ambitious designs of Edward I. of England to make Scotland a part of his kingdom, as he had Wales. The situation was further complicated by the death of Margaret of Norway, who had been selected for the crown at a meeting of the estates of Scone, and soon after followed the long struggle of John Baliol, Robert Bruce, and David de Hastings. The dispute was settled by arbitration under Edward I. of England. He decided in favor of Baliol, who received the crown at Scone in 1292. Edward soon after invaded Scotland, took the king prisoner, and placed the entire country under English officials and garrisons. William Wallace and Robert Bruce soon raised large armies to throw off English occupation, and Edward I., dying in the meantime, was succeeded by Edward II. The latter was defeated by the Scots under Bruce at the battle of Bannockburn on June 24, 1314, and Bruce reigned with remarkable success until his death in 1329, as Robert I.

Robert I. was succeeded by his son, David II., but Edward Baliol, son of John Baliol, made pretentions to the throne and received powerful support from Edward III. of England. He was successful in a number of battles, and was crowned at Scone in 1322, but David succeeded in defeating him shortly after, and continued the war against England. He was succeeded in 1370 by his son, Robert II., who was the first Stuart on the throne of Scotland. After his death in 1390, his son, Robert III., succeeded to the throne, and at his death, in 1406, James I. became king under the regency of the duke of Albany. Internal strife greatly disturbed the kingdom and resulted in James being held a prisoner in England for eighteen years, where he secured an excellent education and finally obtained his release, receiving the crown at Scone in 1423. He reformed the constitution of the parliament and established obedience to law, but was murdered at Perth in 1437. His son succeeded to the throne as James II. when only seven years of age, which again placed the country under a regency, and he was killed in the siege of Roxburgh Castle in 1460.

James III., now only eight years of age, became king. He married Margaret, daughter of the Norse king, Christian, and received the Shetland and Orkney islands, which have ever since belonged to Scotland. His reign was generally successful, but it was disturbed by the pretentions of the nobles, which finally resulted in a battle and his death at Sauchieburn in 1488. He was succeeded by his son, James IV., who in 1503 married Margaret, daughter of Henry VII. of England, thus hastening the union of the two kingdoms. James formed an alliance with France and invaded England in the reign of Henry VIII., which resulted in his defeat and death at Flodden Field in 1513. His infant son succeeded him as James V., when only two years of age, under the regency of the duke of Albany, but in 1528 attained to full government. The chief events of his reign include those in connection with the war against England, in which he was finally defeated at Solway Moss, and died a few days later at Caerlaverock Castle, on Dec. 14, 1542.

James V. was succeeded by his infant

daughter Mary, who was born a few days before his death. Her reign is famous for the Reformation in Scotland, and because of extended discussions regarding the question of uniting Scotland and England. She was affianced to the dauphin of France and sent to Paris to be educated, the government at home being conducted under the regency of her mother. Her marriage with the dauphin was celebrated in 1558, but his death two years later caused her to return to Scotland, where she found two well organized parties, the Reformed party under the leadership of the earl of Moray, and the Roman Catholics headed by Huntly. Her unfortunate marriage to Darnley, in 1565, lost her the support of the Reformed party, and shortly after the murder of her husband she married Bothwell, which caused a large number of her subjects to become alienated. After vainly attempting to defend her rights against a strong confederacy at Loch Leven Castle, she was forced to abdicate in favor of her infant son, who, in 1567, became king under the regency of Moray. Soon after she attempted to recover the throne, but her forces were defeated and she escaped to England, where she was kept a prisoner for eighteen years by Elizabeth, and in 1587 was beheaded at Fotheringay Castle. Her son assumed the title of James VI., and on the death of Elizabeth, in 1603, succeeded to the throne of England, being the nearest heir. He is known as James I. of England, and on receiving the crown at Westminster assumed the title of king of Great Britain, France, and Ireland.

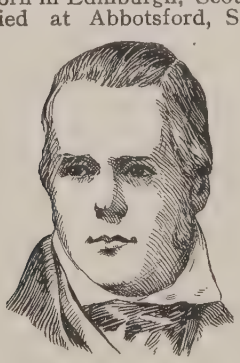
At the death of James VI., in 1625, the throne passed to Charles I., whose reign was disturbed greatly by foreign wars and internal troubles, and ended in his execution in 1649. His son, Charles II., became king under the promise that he would espouse the cause of the Covenanters, and landed in Scotland in 1650, but his reign was disturbed by the events attending the protectorate under Cromwell, and he was finally defeated at Drumclog in 1679. On his death, in 1685, he was succeeded by his brother as James VII. of Scotland and II. of England. His short reign was disturbed by religious dissensions. In 1688 William and Mary were placed on the throne by the Revolution, and they were succeeded by Queen Anne in 1702. The last meeting of the parliament of Scotland was held in 1706, when articles for the final union between Scotland and England were drawn up. This was the result of the general feeling that peace could not be maintained for any considerable time with the two countries separated. Among the conditions provided were that the name of the united country should be Great Britain; that the Presbyterian Church of Scotland should be maintained; that the crown of the United Kingdom should be vested in the Electress Sophia of Hanover and her heirs, being Protestants; that the laws and customs relating to property and private rights should be maintained in Scotland; that there should be free intercourse, equal trade, and citizen rights between the two countries; and that sixteen peers and forty-five members of the house of commons should represent Scotland in the national parliament in London. After that time the history of Scotland is merged into that of England and Great Britain.

The Gaelic or Celtic tongue was spoken in northern and western Scotland down to the 15th century, and in the lowlands toward the center and east English prevailed. Peculiar characteristics prevail that still mark with local dialects the language spoken in different parts of the country, but there has been a constant tendency to make the language conform to the form spoken in northern England. The literature of Scotland may be said to date from 690, when Adamnan, abbot of Ionia, wrote the life of his predecessor in the Latin. This was followed by other productions in the native dialect, but there were few writings of note until in the latter part of the 14th century, when Barbour wrote his famous work entitled "Bruce." Wyntoun's "Oryginale Cronykil of Scotland" appeared about 1422, and about the same time James I. wrote a number of poems, among them "King's Quhair." William Dunbar produced a number of excellent writings in the latter part of the 15th century, and so also did Gawyn Douglas and Sir David Lyndsay. A work on religion by John Hamilton, archbishop of St. Andrews, was published in 1552 under the title "Catechism, that is to say ane Commone and Catholike Instruction of the Christian People in Materis of our Catholike Faith and Religioun." In 1560 Sir Richard Maitland published a collection of satirical poems, and soon after Alexander Scott wrote a number of domestic poems, among them "Jousting Betwixt Adamson and Sym." Other writers of this period include Alex. Montgomery, Sir William Alexander, and John Rolland.

Scottish literature was greatly influenced by the Reformation. Among the leading writers of that period are John Knox, James VI., and Sir David Lyndsay. The last named is noted particularly for his collection of songs published in 1597, entitled "Ane Compendious Booke of Godly and Spiritual Sangs for Avoiding of Sinne and Harlotrie." Allan Ramsey (1686-1758) is the author of a collection of songs and short essays, entitled "Gentle Shepherd." Many songs, ballads, essays, and other productions belong to that period. Subsequently Scottish literature became interwoven with that of England, and an account of it will be found in the subject under English literature. Among the prominent writers of Scottish descent are Sir Walter Scott, Hector Macneil, James Hogg, Fergusson, Burns, Ramsey, John Galt, and George MacDonald.

SCOTT, David, historical painter, born in Edinburgh, Scotland, Oct. 10, 1806; died March 5, 1849. He was the son of Robert Scott, an engraver, who instructed him in landscape engraving, but soon he developed talent as a painter. His first exhibit was made in 1828, when he exhibited in Edinburgh his paintings entitled "Hopes of Early Genius;" "Adam and Eve," and "Sarpedon Carried by Sleep and Death." In 1829 he became a member of the Scottish Academy, but soon after went to Rome to come in touch with the works of noted artists in the galleries of Italy. His paintings include illustrations of the "Ancient Mariner" and of "Pilgrim's Progress." Among his best known works are "Queen Elizabeth at the Theater;" "Monograms of Man;" "Nimrod;" "Vasco da Gama Encountering the Spirit of the Cape," and "Cain." He wrote a number of articles for "Blackwood's Magazine" in 1839-41.

SCOTT, Sir Walter, eminent novelist, born in Edinburgh, Scotland, Aug. 15, 1771; died at Abbotsford, Sept. 21, 1832. He descended from a family of excellent standing, and though feeble as a child, he matured as a man of robust health and strength. After attending the high school of Edinburgh, he entered the university in that city, where he graduated. He was not distinguished as a student, but was famous among his fellows for ingenuity in telling stories. After leaving the university, he began to practice the profession of law, being admitted to the bar in 1792. Law had little charm for him, and his attention was soon attracted to English, German, and Italian authors. His first work as an author was in making translations from the German. These included Bürger's "Lenore" and "Der Wilde Jager" (The Wild Huntsman), which met with success on being published in 1796. When a youth he had spent a part of his time at the farm of his grandfather near Kelso, where he became acquainted with legends, ruins, and historic localities. These he turned to good account in his ballads of "Glenfinlas" and the "Minstrelsy of the Scottish Border," the latter appearing in three volumes in 1802.



SIR WALTER SCOTT.

He attained marked popularity in 1805 by publishing "Lay of the Last Minstrel," a production written in an original ballad style. After publishing his "Marmion" in 1808, and "Lady of the Lake" in 1810, he was offered the position of poet laureate, but declined that honor in favor of Robert Southey. Other poetical works written about the same time include "Lord of the Isles;" "Vision of Don Roderick;" "Harold the Dauntless;" "Bridal of Triermain;" "Doom of Devorgoil," and "Halidon Hill." However, his popularity as a poet declined somewhat, partly because he was not fortunate in selecting the theme for his poem "Rokeby," and partly because of the eclipsing glory of Byron's genius, and hence entered the field of the novelist. In 1814 he published the first of the "Waverley Novels," which established an epoch in modern literature. Scott concealed the name of the author, but their popularity was such that the writer was spoken of as "The Great Unknown." Among the most popular of these novels are "Rob Roy;" "Old Mortality;" "Ivanhoe;" "Guy Mannering;" "Heart of Midlothian," and "Black Dwarf." His literary work proved highly profitable, and he purchased a farm of one hundred acres on the Tweed River, about three miles above Melrose, in 1818. As his resources increased, it was enlarged from time to time until he possessed an estate that became known as Abbotsford. Large sums of money were spent to improve this materially, and he showed remarkable liberality in aiding persons ambitious to become scholars and writers.

Scott had a partner in the publication of his books, the firm being known as Ballantyne and Company, but in 1825 it became involved through the failure of Constable and Company, Edinburgh publishers. His liabilities resulting from the failure amounted to $650,000, but he declined the help of friends and an offer of compromise made by his creditors, preferring to make an effort to liquidate all obligations by his writings. Soon after he removed to Edinburgh, where he worked with remarkable industry on his later writings, which include "Life of Napoleon," the novel "Woodstock," and a series of tales from Scottish history entitled "Tales of a Grandfather." It was possible to pay his creditors $200,000 within a short time. Excessive exertion made it necessary to visit Italy on account of failing health, but he was soon taken back to Abbotsford and died shortly after. His writings and copyrights brought in sufficient to pay off all his debts. He was buried in an aisle in Dryburgh Abbey. Scott was a genial Scotchman, beloved by his neighbors and contemporaries, and noted alike for his honesty, kindness, and hospitality. As a story-teller he has scarcely an equal, and his writings are popular among all classes of readers. His poems have made the scenery of Scotland famous. All his writings have a good moral tone, and tend to promote a sense of honor and a manly dignity of character. Among the honors bestowed upon him was a baronetcy by George IV. in 1820, and he was fittingly remembered by many important societies and associations.

SCOTT, Winfield, distinguished general, born in Petersburg, Virginia, June 13, 1786; died at West Point, New York, May 29, 1866.

WINFIELD SCOTT.

He was educated at William and Mary College, studied law and was admitted to the bar. In 1808 he entered the army as captain, and at the beginning of the War of 1812 was sent on an expedition into Canada. He fought with great bravery at Lundy's Lane and Queenstown, but was taken prisoner in the latter engagement. After being exchanged, he was promoted to the rank of major-general, and distinguished himself at the battles of Chippewa and Bridgewater in 1814. He saw no active service after this until the nullification excitement in South Carolina, when he commanded at Charleston, and subsequently served against the Seminoles and Creeks. In 1841 he was made commander-in-chief of the United States army, and as such took charge of the United States forces in the second year of the Mexican War, in 1847. After conducting a siege at Vera Cruz, he captured it, and in rapid succession took Cerro Gordo, Jalapa, and Puebla. Shortly after he won the victories of Contreras, Churubusco, and Chapultepec. On Sept. 14, 1847, he entered the City of Mexico, which he held until the treaty of peace was concluded in 1848. The whigs nominated him for president in 1852, but he was defeated by Franklin Pierce, his democratic opponent. Soon after he was commissioned to aid in rectifying the boundary line between the United States and Canada. He was still in command of the army at the beginning of the Civil War, but resigned the position in October, 1861. Scott was a man of imposing stature and enforced strict military discipline.

SCRANTON (skrăn'ṭon), a city of Pennsylvania, in Lackawanna county, in the northeastern part of the state. It occupies an excellent site on the Lackawanna River, has important railroad facilities, and enjoys a large manufacturing and commercial trade. Its 165 establishments represent a capital of $35,500,000, and employ about 10,800 persons. Among the principal manufactures are cotton and woolen goods, hardware, leather, carriages, buttons, glass, engines, machinery, tobacco products, lumber products, flour, and spirituous liquors. It has extensive electric street railway lines, gas and electric lights, pavements, waterworks, and numerous public parks. The principal buildings include the county courthouse, United States government building, city hall, state armory, St. Patrick's cathedral, Moses Taylor Hospital, and Albright Memorial Library. It has many fine public school and church buildings. The city is supplied with a number of important educational and scientific societies, thus enriching its social life. It ranks as the thirty-eighth city of the United States. Population, 1900, 102,026.

SCREAMER (skrēm'er), a class of wading birds native to South America. In habits they resemble somewhat the duck, but do

COMMON SCREAMER.

not have webbed feet. They have large feet, a short, conical bill, a bare space around the eyes, and two spurs on each wing. The color is blackish-brown, and the size is nearly that of a turkey. Screamers frequent swamps and marshes, where they feed on insects, water plants, and seeds. The horned screamer has a long, slender horn on the top of the head. It is nearly four feet long, and is seen mostly near the sea. These birds are found in large numbers in Brazil, Guiana, Venezuela, and other countries of South America. They are so named from their loud and harsh cry.

SCREW, one of the six mechanical powers, which is a modification of the inclined plane. It consists of a wooden or metal cylinder, called the male screw, having a groove or thread in an advancing spiral on its outer surface. It may be used separately, as in fastening metal to wood, but in fastening objects to metal a female screw is used in connection with a male screw corresponding in diametrical size and cut of the spiral ridge. If one be turned while the other remains fixed, there is an advance equal to the distance between two connective threads. The mechanical effect is increased by making the threads finer, or decreasing the distance between them, or by increasing the length of the lever by which the power is applied. If the power moves through a circumference of thirty inches, and the distance between two consecutive threads is one-tenth of an inch, a force of one pound

applied at the head of the screw will move a weight of 300 pounds at the other end, since the power moves through a distance 300 times as great as that which the weight moves. Equilibrium results when the circumference at which the force is applied bears the same proportion to the pitch of the screw as the distance bears to the applied force. Thus friction enters very largely as a modifying element. There are many uses of the screw, but its common use is to exert great pressure or overcome great pressure through a short distance. Among the common forms are the screw-nail, for fastening separate pieces of material; the gimlet, for boring; and the screw-presses and jack-screws for securing pressure. Other forms include the endless-screw, ball-screw, Archimedian-screw, screw-propeller, etc.

SCRIBE, an order of teachers among the ancient Jews, whose office was to write and teach the Mosaic and traditional law. The name was first applied to military secretaries, who kept the records of the nation, recruited and organized troops, and levied the war taxes. At the time of the Babylonian captivity the language in which the law was written had become obsolete and a new order of scribes had arisen among the Levites, of whom Ezra was chief. To them was entrusted the task of transcribing and translating the law, and of applying it to conduct. They grew rapidly to influence, and at the time of Christ comprised the learned body of the nation, when they were looked upon as public teachers and lawyers. Their rank was in accordance with their talents. The higher class occupied a place in the sanhedrim, practiced law, or taught in schools; while the less gifted engaged more largely in transcribing and writing laws. The scribes united with the chief priests in plotting the death of Christ.

SCROFULA (skrŏf'ū-lȧ), a constitutional disease, either hereditary or acquired, leading up to the formation of tubercles in various tissues and organs of the body, chiefly in the lymphatic glands. It is generally inherited, and attended by glandular tumors that degenerate into ulcers, particularly at the side of the neck and under the angles of the jaw. The disease has a disposition to degenerate into consumption of the lungs or of the mesentery, a fold of the peritoneum that infests an intestine or other viscus and connects it with the abdominal wall. Scrofula is sometimes called king's evil, from the view long held in England that scrofulous tumors and abscesses could be cured by the king's touch.

SCUDDER (skŭd'ẹr), **Horace Elisha**, teacher and author, born in Boston, Mass., Oct. 16, 1838. He graduated from Williams College in 1858, and soon after entered the public schools of New York City as a teacher, where he did efficient work for three years. In 1862 he published "Seven Little People and Their Friends," a work that proved sufficiently successful to induce him to take up literature as a profession. He was editor of "The Riverside Magazine for Young People" in 1867-70, and in 1890 removed to Cambridge, where he became the editor of the "Atlantic Monthly." His numerous writings include "Dream Children;" "Stories from My Attic;" "Dwellers in Five-Sisters Court;" "History of the United States;" "Men and Letters;" monograph on "Noah Webster," and "Biography of Washington." He edited the "American Commonwealth Series," and with Mrs. Bayard Taylor published "Life and Letters of Bayard Taylor." He died Jan. 11, 1902.

SCULPTURE (skŭlp'tŭr), the art of imitating natural objects, chiefly the human body, by carving or chiseling figures from stone or other solid material, or of modeling them in some plastic substance for subsequent reproduction by carving or by casting, as in bronze. The word is from a Latin term meaning to cut out or carve, but it is used to express the molding of figures in clay, wax, or other material, to be afterward cast in some metal or plaster. Sculptures are of two classes, known as sculpture proper and relief. In sculpture proper the three dimensions of length, breadth, and height are reproduced; while in relief the dimension of thickness or depth is relatively reduced. Different names are applied to productions in relief according to the depth in which the object is represented. Bas-relief is a common form, and is a type of carving or sculpture in which the figure projects but slightly above the background. Mezzo-rilievo is a type of sculpture in half-relief, and alto-rilievo is a form in which the carving or figures stand out very strongly from the background.

The materials generally used in sculpturing include marble, stone, ivory, gold, bronze, granite, and wood, but any substance that may be cut or molded into form is employed for various products. The art has many disadvantages as compared with painting in recording facts and representing ideas, since neither color nor picturesque backgrounds may be utilized in sculpture, though there are exceptions to this general rule. While paintings appeal to the sense of sight chiefly through color, sculptures rely wholly upon pure form, both of line and composition, thus differing from painting in the mode of expression. In modern sculpture the artist usually models his work in moist clay, which in the case of a large statue is supported by a skeleton framework. If the finished product is to be in marble, a plaster cast is made from this model, which a skilled workman uses in preparing a copy, while the sculptor puts on the finishing touches.

Sculpture is one of the most ancient of arts. Its origin is lost in antiquity. The first productions were in clay, but as knowledge advanced other materials, such as wax,

marble, and bronze, came into use. It is remarkable that the most ancient sculptors did not seek to represent natural figures, but instead connected their products with mythology and religion, thus producing representations of strange and fantastic figures. The Egyptians made the earliest forms of higher art, and their sculptures differ from those of China and India in representing men engaged in various industries instead of confining them to gods and deformities of the human figure. Most of their products are large, and are peculiar for symmetry, stability, and calm and solemn expression. The most distinct and dignified sculptures of Egypt date from the period included between 1500 and 1000 B. C., but there are large and remarkable productions dating much earlier, particularly the Sphinx, which is thought to date from about 4000 B. C. Assyrian sculpture is like that of Egypt in representing historical and general scenes. While more vigorous in spirit, it is much inferior in idealistic beauty and trueness to nature. It dates from the 9th and 10th centuries B. C. Persian sculpture reached its height of development in 575-331 B. C., but is less beautiful and artistic than the Assyrian. The early sculptures of India are chiefly in connection with the religion of Buddhism and later Brahmanism, and all may be said to be inferior as art products. While the works of art produced in Egypt and Asia are of interest historically, they are particularly valuable as influencing the development of art among the Grecians, who carried sculpture to the highest perfection.

The first forms of Grecian art bear a close resemblance to those of the East, but by the 6th century B. C. a distinct school developed, and their artists began to replace the conventional and lifeless types of Eastern sculptures with human figures true to nature. Among the earliest works of Grecian art that have come down to us are the sculptures from the temple of Athena at Ægina, which date from about 475 B. C. A number of them are preserved in the museum at Munich, Germany. Phidias carried Grecian art to its highest perfection about 442 B. C.; his most notable productions are the statues of Athene in the Parthenon, and that of Zeus in the temple at Olympia. Sculpture in his time still retained connection with mythology, but it showed remarkable nearness in imitating nature, thus furnishing beautiful specimens of art in which human beauty was characterized by spiritual and god-like perfection. Sculpture declined for nearly a century after the time of Phidias, but new interest was awakened by Praxiteles about 363 B. C. This sculptor began to represent the human body more fully than the workmen prior to his time, and he was the first of the great artists to represent human form quite nude. Other noted artists of Greece include Scopas, who made the "Niobe Group," now at Florence; Chares, the author of the famous "Colossus of Rhodes," and Agasias, the sculptor of the "Fighting Gladiator." Other productions dating from about the 4th century B. C. include the celebrated group of the "Laocoön;" "Apollo Belvedere;" "Venus of Milo;" "Dying Gladiator," and "Dying Alexander."

Roman sculpture may be attributed wholly to Grecian artists, who found employment in all parts of Italy after the Roman conquest of Corinth. The Romans carried the finest treasures of art from Greece to Rome, whence many of the valuable specimens were carried to Byzantium in the 4th century A. D. by Constantine. Art declined in Italy with the barbaric invasions from the north. It began to revive in the 10th century, but no material advancement was made until the early part of the 13th century, when Nicola Pisano carved a number of fine specimens of art at Pisa and Siena. His son, Giovanni, is the next artist of note, but the most marked progress in the revival of art began with Lorenzo Ghiberti (1381-1455), who made the wonderful doors of the baptistry of Florence. Donatello is noted for his statues of St. George and St. Mark. Verocchio is the most famous sculptor of the 15th century, but the perfection of Italian art was reached in the sculptures of Michael Angelo in the 16th century. Lorenzo Bernini (1598-1680) is one of the most noted Italian sculptors of the 17th century. Canova is the greatest representative of the 18th century, and Monteverde and Gallori of the 19th. Sculpture found its way from Italy toward the north and west with remarkable rapidity at the beginning of the revival of learning. At present there are representative schools in the different European and American countries. Among the noted sculptors of Germany are Albert Dürer, Peter Vischer, Rauch, Kiss, Bandel, Drake, and Schilling; those of France include Jean Goujon, Pierre Puget, Rodin, Dubois, and Mercie; those of Denmark, Thorwaldsen; and those of England, John Flaxman, John Gibson, Alfred Stevens, and John Henry Foley. The most eminent sculptors of the United States include Crawford, Greenough, Clevenger, Bartholomew, Rinehart, Ward, Thompson, Hosmer, Rogers, and Warner.

SCUTARI (skōō'tä-rē), a city of Asiatic Turkey, on the eastern shore of the Bosporus, opposite Constantinople. It occupies a fine site on slopes gradually rising from the water, has good railroad facilities, and is the seat of a large interior and foreign trade. Scutari has many beautiful mosques, baths, and bazaars, and is the seat of several educational institutions, including a dervish college. Its extensive cemeteries are famed for their beauty, being adorned with magnificent cypress trees and works of art. The high degree of interest in the cemeteries is due to the fact that the Turks look upon Asiatic soil as sacred, and in it they desire

to have their last resting-place. Scutari is well fortified. It has a large trade in cereals and fruits. Among the manufactures are cotton textiles, silk and woolen goods, saddlery, implements, and machinery. The English occupied Scutari in the Crimean War. Immediately south of it is the burial-ground established for the soldiers of the British army. Florence Nightingale made it the base of her operations during that war, and in the burial ground is a beautiful monument in honor of the troops. Population, 35,500.

SCYLLA AND CHARYBDIS (sĭl'lȧ and ka-rĭb'dĭs), two personages described by Homer, who regarded them highly dangerous to navigators. Scylla is at present the name of a rock in the Strait of Messina, on the west coast of South Italy, and near it, nearly opposite the entrance of the harbor of Messina in Sicily, is the celebrated whirlpool of Charybdis. The ancients associated their legend of Scylla and Charybdis with these two dangerous obstructions, representing Scylla as a monster with twelve feet and six mouths; while Charybdis three times each day sucked down the water of the sea, and as often threw it up. When Ulysses passed the terrible dangers of Scylla and Charybdis, the former swooped down and seized six of his crew from the deck. From this circumstance arose the proverb, "To shun Charybdis and fall into Scylla."

SCYTHE (sīth), an implement used for mowing and reaping. It consists of a long, curved blade attached to a handle. The blade is sharpened on its inner or concave side, and is swung with both hands, the workman holding it by two smaller handles attached to the principal one. The scythe was preceded in general use by the sickle, an instrument with a short, curved blade and a wooden handle, to be held in one hand when reaping. Later a framework of wooden bars was fastened above the blade of the scythe, thus forming the cradle. The scythe is used mostly in cutting grass and weeds on small farms, and the cradle has taken its place in cutting grain. These implements are generally used in countries where farming is on a small scale or in a primitive state, the reaper having taken their place in all leading agricultural countries. However, all well equipped farms have a scythe for various purposes, such as cutting weeds and grasses where a mower can not be used.

SCYTHIANS (sĭth'ĭ-ȧnz), the name of a race of people that anciently occupied the region from the Carpathian Mountains in Europe to the Aral Sea in Asia, where they were found by the Greeks when settling on the north shore of the Black Sea, in the 7th century B. C. Ancient writers used the name with considerable vagueness, often associating it with the Scoloti and other nomadic tribes, but the name Scythian was applied generally to the wandering tribes that occupied the region between the Carpathians and the Volga. These people led a wandering life, subsisting by rearing large herds of cattle, sheep, and horses. Their food consisted of cheese, milk, and boiled flesh, and their habitations were in wagons roofed with felt and drawn by oxen. As the food supply of one region became exhausted, they moved to newer pasture, their horses and cattle following, and later their sheep. The government was despotic. It was vested in a number of chiefs. Their warriors developed remarkable skill in handling the bow and arrow on horseback. A large army of Scythians invaded Media in the latter part of the 7th century B. C., which they made subject for ten years, but were finally expelled by Cyaxares. In the 2d century B. C. they invaded Persia, where they founded a kingdom known as Indo-Scythia, and in the 1st century B. C. they secured a foothold in northern India, which they occupied about four centuries. Grecian writers regarded the Scythian language of Aryan derivation, and as nearly akin to the Iranian. Scythia was the name of the region lying between the Volga and the frontier of India in the time of the Roman Empire.

SEA, or **Ocean**, the great body of salt water, which covers about three-fifths of the earth's surface. It is one continuous expanse of water, but for purposes of description and study it is generally divided into five smaller bodies. They are known as the Pacific, Atlantic, Indian, Arctic, and Antarctic oceans. The Pacific separates America from Australia and Asia; the Atlantic separates America from Europe and Africa; the Indian lies between Africa and Australia, and the Arctic and Antaractic lie respectively within the north and south polar circles. The comparative sizes may be stated in the following order: one-half of the entire water-area of the earth is included in the Pacific, one-fourth in the Atlantic, one-fifth in the Indian, one-seventeenth in the Antarctic, and one-thirty-fifth in the Arctic. There are variously formed coast lines, but they may be arranged in the four classes forming inland seas, border seas, gulfs and bays, and fiords. Inland seas are those formed by a nearly continuous land-border, as the Gulf of Mexico and the Red Sea; border seas are isolated from the rest of the ocean by island chains and peninsulas, as the Gulf of St. Lawrence and the Sea of Japan; gulfs and bays are broad expansions of the water extending but a small distance into the land, as the Bay of Biscay and the Gulf of Guinea; and fiords are deep inlets with high, rocky headlands, extending often from forty to one hundred miles into the land, as are found off the coasts of Norway and Chile.

The bed of the ocean is diversified like the surface of the land, having plains, mountains, rocks, and valleys, though the irregularities are fewer. It has been demonstrated

by recent soundings that many of the plains and plateaus of the ocean are of great size, compared with those of the continents, and there are submerged mountain ranges both along the shores and in the deep ocean. The mean depth of the ocean is placed at 12,600 feet, or nearly two and a fourth miles. It is thought that the greatest depth of the Atlantic is in the neighborhood of the island of St. Thomas, in the West Indies, where soundings have established a depth of 27,300 feet. The deepest region in the Pacific Ocean is east of Japan, where a depth of 27,935 feet has been reached, this being somewhat less than the highest elevation of the land. It is found that the greatest depths are near the highest elevations, though there are some possible exceptions. The entire bulk of water in the ocean is placed at 323,813,000 cubic miles, and it is estimated that if the surface of the earth were perfectly level a sheet of water two miles deep would entirely surround the crust.

Sea water in small quantities is transparent and colorless, but when viewed in a large mass it has a deep-blue appearance. The reddish or greenish hue often seen in limited portions of the ocean is due to the presence of numberless organisms, and the phosphorescence visible at night in some places arises from the presence of animalculæ, but this phenomenon appears only where the air comes in contact with the water, as in the crests of waves or the disturbance of the surface due to the passage of a vessel. Sea water is heavier than fresh water in the proportion of 1.027 to 1, owing to its containing a number of saline ingredients. There are about three pounds of various saline matters to every hundred pounds of ocean water. The saltness of the ocean is due to the evaporation taking up pure water, which is borne in the form of clouds to remote regions and dropped to the surface of the earth in the form of rain, which, as it flows through the channels of streams, carries large quantities of mineral matters into the sea. It is estimated that about 6,575 cubic miles of water is taken up in this way annually. Thus it is not difficult to understand that large quantities of mineral ingredients are dissolved from the crust of the earth and carried with the current.

Oceanic water is affected constantly by vast movements, which correspond to the motions of the atmospheric air. They are known as waves, tides, and currents. Waves are swaying movements of the water, caused by the action of the wind. Apparently the wave motion is in the direction in which the wave is advancing, but there is no perceptible progressive movement of the water, except in shallows. The height of waves depends upon nearness to the shore and depth of the sea, ranging usually not over six feet in the open sea with a moderate wind, and in high storms from thirty to sixty feet. The wave-motion decreases rapidly in proportion to the depth below the surface, and there is a very feeble effect at a depth of forty feet, even in moderately strong winds. Tides are the periodical risings and fallings of the water, caused by the attraction of the sun and moon. These follow each other with marked regularity about every six hours, and, unlike waves, whose motion is confined practically to the surface waters, tides influence the waters of the ocean from top to bottom.

Ocean currents affect the water of the sea with considerable regularity, causing it to move to and from the equatorial and polar regions. In this way they constantly produce an interchange of water between the lower and higher latitudes. They somewhat resemble rivers, but are vastly wider and deeper, and, unlike waves, consist in a real onward movement of the water. These currents are caused chiefly by the difference of density of water produced by the inequality of temperature between the equatorial and polar regions. The warmer waters from the equatorial region are upper currents and move both north and south from the equator, but never cross it, and as they lose their heat they become denser, and, sinking to the bottom, spread throughout the ocean basin. It has been found that there is no perceptible difference in the temperature of the water near the bottom of the sea in any latitude, the extreme difference ranging from four to six degrees. The lowest temperature at the greatest depth near the equator is about 35° Fahr., and in the highest latitude it reaches about 28° Fahr.; while the temperature at the surface varies from 85° Fahr., in the former to 28° Fahr. in the latter region. Ordinary ocean water freezes at 27° Fahr., and in places where it is densely salt the freezing point is still lower. Since ice formed of ocean water is comparatively fresh, it follows that the salt, being separated as the water freezes, increases the per cent. of salt in the lower strata; and thus the water below the ice may have a temperature lower than that at which the surface freezes, without being transformed into ice.

The constant circulation of water in the ocean causes a general distribution of oxygen and other atmospheric gases throughout the sea, even to the greatest depth. It follows from this that both plant and animal life may subsist in all parts of the sea, but their form and size depend largely upon the depth and temperature. Animal life is most abundant at the surface and near the bottom, but there are living forms throughout the intervening space. The sea has many different species of both plants and animals, some being confined to the bottom, others floating in the water, while still others are in shallows coming in contact with both the bottom and the surface. Pelagic deposits of matter at the bottom of the sea are remains of the fishes and other forms of life that

sink after death, and there are deposits known as terrigenous, which are formed of earthy matter carried into the sea by the movements of oceanic waters and through the action of streams.

SEAL, the general name of certain genera of carnivorous mammals, having feet adapted for swimming, and being able to

COMMON SEAL.

live both in and out of water. The body is long and slender, tapering toward the tail, and the small head is destitute of outside ears. They have five toes on each limb, joined to each other by webs, the two fore limbs being short and adapted to crawling out of the water, and the hinder limbs projecting backward on each side of the tail. Seals are able to remain under water nearly half an hour, where they pursue their prey by swimming with great rapidity, but their movements on land are awkward. Most of the time is spent in water, but seals congregate a part of the time on the shores, where they repose and bask in the sunshine on sandbanks, ice-fields, or rocks. There they also bring forth their young. They subsist mostly on fishes, which they pursue with marked skill, often chasing them up the mouths of rivers, but they also feed on crabs and other forms of marine life. In the warm season they move toward the colder regions of the north and south poles, and in winter go to the milder waters. They make holes in the ice in the winter, thus enabling them to come up to breathe, where they are often watched by the Esquimos and caught for their flesh and skin. The oil is of value in lighting, warming, and cooking. Their skins are used in making clothes, coverings of capes and coats, and for footwear. The sinews are employed by the natives in making fishing lines and thread. Sealskins form an important commodity of commerce, being of value in making articles of wear, such as caps, ladies' cloaks, and trimmings. They are employed to some extent for card cases, pocketbooks, and other articles. The oil, known in the market as seal oil, is made from the fat or blubber, and is more valuable than whale oil. The fur is of a grayish-brown color, mottled with black, and is usually dyed before being used for articles of wear.

Many species of seals have been described, varying somewhat in size, nativity, and habits. The common seal is most abundant in the northern regions. It attains a length of from three to five feet. The female usually produces one young at a birth, but sometimes two. They are animals of considerable intelligence, having large and brilliant eyes and a well developed sense of smell, and may be trained to perform peculiar tricks when domesticated. It is possible to teach them to come when called by name, and to obey instruction of various kinds. The sea-lion is a larger species, attaining a length of from ten to twelve feet, and a weight of about 1,000 pounds. It is destitute of fur, but its hide, fat, flesh, sinews, and intestines are useful to the natives and in commerce. Sea-lions are found in the North and South Pacific, particularly on the coast of the Kurile Islands, off Kamchatka, and in the vicinity of San Francisco. The harp-seal is a species common to the northern part of Europe. The crested-seal has a peculiar crest above the nose, and is native to the northern parts of North America. A spotted species, known as the leopard-seal, is native to the South Orkney Islands. The elephant-seal, or sea-elephant, is the largest of this class of animals. It is native to the Antarctic seas, and attains a length of from twenty to thirty feet. The northern sea-lion is a species having a small outer ear, an extended neck, and a mane of crisp hairs on its neck and shoulders. It is native to Alaska and the Pribilof Islands.

It requires considerable patience and skill to successfully conduct seal hunting, owing to the gregarious habits of most species, and their tendency to have one or more sentinels constantly watching for danger. The most extensive hair-seal fisheries are off Newfoundland, in the Caspian Sea, and off

SEA-ELEPHANT.

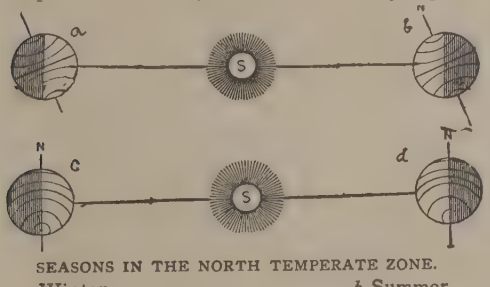
Jan Mayen, but nearly half the world's supply is secured off Newfoundland. The principal fur-seal fisheries are off the coasts and islands of Alaska and Kamchatka. Seals are most commonly secured by shooting while congregated on the ice, but in some cases they are watched at their holes in the

ice and secured by inflicting a wound on the head administered by a club or some similar implement. Reckless destruction of these animals has caused the supply to decrease rapidly. In 1870 about 100,000 seals were taken in the vicinity of Bering Sea, but there has been a general decrease until in 1901 only 22,470 skins were secured in the same region. It is thought that ultimately pelagic sealing, the killing of seals in the deep sea, should be prohibited entirely, and that the sealing season on the coasts should be limited to several months, in order to preserve a supply of these animals.

SEALED ORDERS, a term applied to orders issued and delivered to the commanding officer of a ship or squadron, and whose seal is not to be broken until the vessel has reached sea. In such cases all on board are ignorant of the destination of the vessel, this being unknown even to the commander. Sealed orders are issued when a ship or squadron is sent on any secret service, the object being to prevent information regarding the movements becoming known.

SEALING WAX, a composition for sealing letters or packets, and receiving the impression of a seal fixed to an instrument. In the Middle Ages sealing wax was made of beeswax and turpentine, and to these was added a coloring matter, usually vermilion. At present beeswax is not used in making sealing wax, but shell-lac is the principal component. The fine grade of sealing wax for stationery contains about seven parts of shell-lac, four of turpentine, and from three to four of vermilion. Inferior grades contain common resin, and the coloring used is red lead, but black coloring is not infrequent. Sealing wax was first employed in China in the 7th century, whence it was introduced into Europe.

SEASON, the division of the year as determined by the position of the earth with respect to the sun, and as marked by a particular state of moisture, temperature, vegetation, and difference in the length of day and night. The rays of the sun shine directly on the equator on the 21st of March, and fall directly on localities farther north until the 21st of June, when the sun is directly over the tropic of Cancer. It begins to move southward on the latter date, shining directly on the equator on the 22d of September, but continues southward until the 21st of December, when it shines directly on the tropic of Capricorn, and thence again moves northward. The effect is that four seasons occur in the temperate zones: spring, summer, autumn, and winter. There are but two seasons in the tropics, the wet and the dry, this being due to an almost uniform temperature throughout the year, and to the fact that rain follows the sun. This results in a wet season succeeded by a dry season at the tropics, while in the vicinity of the equator there are two wet seasons and two dry seasons each year, this being due to the circumstance that the sun crosses the equator twice each year. In effect there are but two seasons in the Arctic and Antarctic regions, a long, cold winter and a short, dry summer. The four distinct seasons are found only in the middle portions of the temperate zones. They are modified noticeably by proximity to the sea and elevation above sea-level.



SEASONS IN THE NORTH TEMPERATE ZONE.

a, Winter. *b*, Summer.
c, Spring. *d*, Fall.

In speaking of the seasons from an astronomical standpoint, it may be said that spring extends from the vernal equinox, when the sun enters Aries, to the summer solstice; summer from the summer solstice to the autumnal equinox; autumn from the autumnal equinox to the winter solstice; and winter from the winter solstice to the vernal equinox. However, this is true only of the north temperate zone, since the seasons are reversed in the southern hemisphere. The greatest summer heat is not reached on June 21, when the days are longest, for the reason that as the rays of the sun shine more nearly vertically on the earth's surface a quantity of heat is stored, and when this is united with the heat received at the time the days begin to decline in length, the temperature gradually rises until the sun's rays fall quite obliquely on the surface. In the same way the coldest days do not occur near Dec. 21, when the days are shortest, but some time thereafter, when practically all the latent heat stored in the surface during the summer has radiated. It will be observed that the warmest part of the day is shortly after noon and the coldest part of the night in the morning, this being due to the same cause.

SEATTLE (sē-ăt'l), the largest city in Washington, county seat of King county, on Elliot Bay, an inlet from Puget Sound. It has convenient railroad facilities, is provided with a safe and commodious harbor, and has a large trade in wool, grain, lumber, coal, hay, furs, fish, and fruits. Among the manufactures are furniture, carriages and wagons, ironware, lumber products, leather, ice, machinery, and earthenware. Besides its fine county buildings, it has excellent public schools and numerous churches. It is the seat of the Washington State University, College of the Immaculate Conception, Seattle Female College, and Academy of

Holy Names. The city has a number of fine libraries, electric and gas lights, street railways, waterworks, public parks, and substantial pavements. A large number of daily and weekly periodicals are published in Seattle, and numerous civic and educational societies are maintained. It was founded in 1852, and received its name from a powerful Indian chief of that region. Its growth has been remarkable, having a population of only 3,533 in 1880, while the census of 1900 accords it a population of 80,671.

SEBASTIAN (se-bast'yan), **Saint**, noted Christian martyr, born in Narbonne, France, about the middle of the 3d century; suffered martyrdom Jan. 20, 288. He was educated at Milan and entered the Roman army as a captain of the Prætorian guard under Diocletian, though without revealing his religious views. It thus became possible for him to protect the persecuted Christians, and to convert the keeper of the prison to Christianity. Later he publicly confessed his faith. Diocletian made a strenuous effort to induce him to renounce the Christian creed, and finding the task useless had him condemned to be executed. The archers who were commissioned to execute him left him as dead, but a Christian lady named Irene found that life was not extinct and restored him to health by careful nursing. Soon after recovery, Sebastian again appeared before Diocletian to confess his faith, but the latter ordered that he be beaten to death in the amphitheater and his body be thrown into the sewer. The Greeks hold his festival on the 20th of December. He has been made the subject of many fine paintings by Italian masters; including Veronese, Mantegna, and Domenichino.

SEBASTOPOL (sĕb-as-tō'pol), or **Sevastopol**, a seaport city of Russia, on the Black Sea, in the government of Taurida. It is in the southwestern part of the Crimea, and has important railroad connections with Eurasian cities. It has a secure and commodious harbor. Sebastopol is the seat of a large interior and foreign trade, particularly in grain, hides, salt, and manufactures. It is strongly fortified. Its harbor is sheltered on the north and south by lofty limestone ridges, and there are ample facilities for the largest vessels to anchor safely on the shore. The allied armies of Turks, French, and English conducted a memorable siege in the Crimean War of 1854-55, and the first bombardment took place on Oct. 17 of the former year. General Todleben defended the land side against the French and English for eleven months, but on Sept. 8, 1855, Malakoff and Redan were captured, which resulted in the Russian evacuation. The city had substantial buildings and a population of 40,000 before the siege, but it suffered a general destruction of property and life by reason of its being bombarded with terrific force. Since then the forts have been rebuilt and the city greatly improved, thus making it an important Russian stronghold and trade center on the Black Sea. Catharine II. founded Sebastopol in 1783, at which time a small Tartar village called Akhtiar occupied its site. Population, 35,790.

SECRETARY BIRD (sĕk'rĕ-tā-rў), a genus of rapacious birds native to Africa and the Philippine Islands. They are so named

SECRETARY BIRD.

from the fanciful resemblance between the crest, made up of a peculiar plume of long feathers, and pens projecting behind the ears of a clerk. The species native to South Africa is typical and the best known. Its head and neck are long, the height when standing about four feet, the color grayish-blue, and the tail very long. Its wings and legs are long. It can fly when once in the air, but greatly prefers to run. The natives and Europeans of South Africa protect it for its service in killing serpents, on which it feeds. It kills the serpents by inflicting severe injury with its feet and beak, or by dropping them from a high elevation while on the wing. Though sometimes bitten by venomous serpents, it appears to be entirely fearless. Secretary birds may be domesticated, in which state they serve to protect poultry.

SECRETION (sē-krē'shŭn), the process by which various matters are separated from others in an organized body and collected at particular places to be employed for special purposes in the system, as the saliva, bile, gastric juice, and mucus. Secretion is performed in animals by organs of various form and structure, but generally by glandular epithelial cells. It appears that neither the form nor internal arrangement of the parts of a gland have any essential connection with the nature of the fluid secreted,

the process of secretion being always performed by the intervention of cells, whose office is to elaborate from the blood substances different than the blood. Certain secretions are to be thrown off the system as useless or injurious, as the urine, which are generally called excretions. The process of secretion is carried on under stimuli of the system, but it is materially enhanced or suppressed by mental conditions. Secretion in plants is the process of separating certain elements from the sap and elaborating them for particular uses. They are produced in the interior of plants, and are made up largely of those known as nutritious secretions, including sugar, starch, albumen, gum, gluten, and lignin. The special or non-assimilable secretions in plants include coloring matters, alkalies, acids, resinous principles, milks, and many others.

SEDALIA (sĕ-dā'lĭ-a), a city of Missouri, county seat of Pettis county, seventy-five miles southeast of Kansas City. It is surrounded by a fertile farming country, which produces cereals, fruits, and grasses. It has important railroad facilities, giving it advantages as a trade center. Among the manufactures are flour, machinery, farming implements, hardware, railway cars, woolen goods, furniture, and boilers. The principal buildings include the county courthouse, numerous churches, and a high school building costing $50,000. It is improved with electric and gas lights, public waterworks, substantial pavements, a public library, and a sewerage system. Sedalia was founded in 1860. Population, 1900, 15,231.

SEDAN (sẹ-dŏn'), a city and fortress of France, in the department of Ardennes, sixty-four miles southeast of Rheims. It occupies an imposing site on the Meuse River, and in its vicinity are extensive deposits of coal and iron. The manufactures include cotton and woolen goods, metalware, pottery, and laces. Sedan is noted as a military and strategic point. It surrendered to the Germans in 1815, and also on Sept. 2, 1870. In the latter year it was occupied by a French army of 86,000 under Napoleon III. and Marshal MacMahon. The German army under King William laid siege to the city, and on Sept. 1 began a vigorous attack, which resulted in the surrender on the following day. Napoleon was sent as a prisoner of war to Wilhelmshöhe, and the republic of France was declared at Paris by Gambetta on Sept. 4. Since then the city has been greatly improved by railroads and modern municipal facilities. The Sedan chair, a portable covered vehicle for carrying a single person, borne on two poles by two men, was invented in and so named from the city of Sedan. Population, 19,185.

SEDGE (sĕj), the common name of an extensive genus of plants, found mostly in swamps and wet places. They are generally distributed in all the temperate and northern parts of the earth. The stems are without joints, usually triangular, and possess little economic value. This genus of plants embraces the bulrushes and the sedges proper, the latter being species of the huge genus carex. A species of allied plants was used by the ancient Egyptians in making papyrus paper. The coarse fodder derived from the sedge plant is of no particular value for domestic animals, since only a few species eat it and those reluctantly.

SEDGWICK (sĕj'wĭk), **John**, soldier, born in Cornwall, Conn., Sept. 13, 1813; slain in battle May 9, 1864. He graduated from the West Point Military Academy in 1837, and soon after served against the Seminoles in Florida. His services were volunteered at the beginning of the Mexican War, in which he rendered efficient services at Cerro Gordo, Contreras, Churubusco, and Chapultepec. In 1861 he was commissioned brigadier-general of volunteers and was assigned to the army of the Potomac. His efficient services in the battle of Fair Oaks won the day for the Union army, and soon after he bore a conspicuous part at Antietam. He was promoted major-general of volunteers in 1862, and fought at Fredericksburg, Chancellorsville, Gettysburg, Rappahannock, and in the Wilderness campaign. His death resulted from a bullet fired by a Confederate sharp-shooter while placing guns in the intrenchments at Spottsylvania Courthouse. In 1868 a fine bronze statue was erected at the West Point Military Academy to commemorate him.

SEED, the body produced by the ripened pistils of plants, from which a new plant may spring. It is an ovule fertilized and matured, and has a germ or embryo formed in it. Upon reaching this perfected state, it is separated from the parent plant, and in it are contained all the necessary elements to bring forth a new life similar to the one on which it grew, and of whch it was a part. It consists of two parts, the nucleus or kernel and the integuments or coats. An outer loose covering, generally an imperfect one, is on many plants while the seed is growing, this being called an aril. The seed coats proper are commonly two, an outer and an inner; the latter generally is thin and delicate. The outer coat is called the testa, and the inner is the tegmen or endopleura, and the two are known as the spermoderm. In some plants the outer coat is close and even, as in the morning glory; sometimes it has a tuft of long hairs, as in the milkweed, while in others it is covered with long, woolly hairs, as in the cotton plant, which forms the useful cotton of the market. Some seeds have a fringe-like wing or tuft at each end, as the catalpa seeds, while the seeds of maples are winged at one end. These tufts and wings are designed to render such seeds buoyant, so they may be dispersed by the wind when ripe. In some plants the seed is borne on a seed-stalk. The scar or hilum is the mark where the seed was attached to

the plant, this being particularly plain in the bean, pea, chestnut, and buckeye.

The whole body of the seed within the coats forms the kernel. It consists of the embryo and the albumen, though in some plants the latter is wanting. Seed albumen is a stock of prepared food, which is designed to support the embryo in the early stage of growth, but in some seeds a similar supply is laid up in its cotyledons. The embryo is a plantlet in miniature. Its formation depends upon the seed, fruit, and blossom. It is nourished by the albumen of the seed until it secures sufficient development to provide for itself. It is protected by the seed coats. The embryo has the radicle or original stemlet, from one end of which the roots grow downward, and from the other the stem is pushed upward. It also sends forth one or more cotyledons or seed leaves, and often a plumule or bud for continuing the stem upward. Some seeds may be stored and kept a long time, while others begin growth soon after coming in contact with moist soil. Wheat, corn, rye, and other cereals begin to sprout immediately after being placed in a moist and warm soil, while the walnut is protected from growth or early decay until the following spring.

Some seeds require time to dissolve their outer covering before they give rise to a new plant, and in others it is necessary for the store of food to be acted on by the ferments lying within the covering. There is much difference in the length of time that seeds may be kept, even under the best of care. Such seeds as those of the poplar and willow must be brought to moist soil within a few days after ripening, while beans, rye, and wheat may be stored for many years. The seeds of plants supply man and animals with wholesome foods, the more important being wheat, rye, oats, corn, barley, buckwheat, coffee, linseed, mustard, nutmeg, cottonseed, rice, beans, peas, etc. Seeds having one cotyledon are called monocotyledonous; those having two are termed dicotyledonous; and the seeds of flowerless or cryptogamic plants are designated acotyledonous. Cryptogams or flowerless plants, reproduce by means of spores, which are analogous to the seeds of ordinary flowering plants, but they contain no embryo. They are mostly one-celled and generally produce extensively.

There has been a steady and growing demand for seeds of farm grains, fruits, and vegetables in America from the first settlement of the country. It was originally customary for farmers and others to preserve seed supplies from their own production, but later the demand for purer and better seed sprang up, which led to the development of regular seed farms. The first of these was established in 1784 by David Landreth, near Philadelphia. With the general development of the country and the growth of cities came a demand for better fruit and vegetables than were reared in the commonplace gardens. Many market-gardeners were induced to grow seeds to supply the demand of those producing the materials for the city market. This ultimately led to the establishment of farms at which seed-production is the principal object. At present there are about 600 farms in the United States devoted exclusively to seed-production. These utilize about 175,500 acres of land, and represent a capital of $20,500,000. Besides the regularly established farms, quite a large number of agriculturists produce seeds to supply local dealers or customers within the immediate neighborhood. The seed industry has led to a general improvement in the nature of the product, and to a diversification of the crops produced. The seeds grown in this way comprise practically all varieties of grasses, grains, fruits, and vegetables. Seed culture is carried on most extensively in New York, California, New Jersey, and Ohio. There has been a growing demand for northern-grown seeds, and as a result the industry of seed-culture has been established in many northern states, particularly in Minnesota, Wisconsin, and Michigan.

SEELEY (sē'lĭ), **John Robert**, historian, born in London, England, in 1834; died Jan. 13, 1895. He studied in the city schools of London and Cambridge University, and after graduating at the latter became one of its fellows. In 1863 he was made professor of Latin in University College, London, and six years later became professor of modern history at Cambridge. He published, in 1865, a remarkable work entitled "Ecce Homo, or the Life and Work of Jesus Christ." It was followed, in 1882, by "Natural Religion," but this attracted much less attention than his first writing. Subsequently he became devoted almost exclusively to history, and besides many others published an elaborate history of the recent development of the German Empire, entitled "Life and Times of Stein." He contributed to many European and American magazines, and in 1894 was knighted. Among his writings not named above are "Expansion of England;" "History of Napoleon I.;" "Goethe Reviewed after Sixty Years;" "Roman Imperialism," and "Letters and Essays."

SEINE (sān), an important river of France, which rises in the department of Cote d'Or, a short distance northwest of Dijon, and after a course of 481 miles toward the northwest discharges into the English Channel. It flows through a highly fertile region, and has a number of important tributaries, among them the Oise, Marne, Aube, and Yonne rivers. Vast canals have been constructed to connect with the Seine, thus making it the basis of a large interior and foreign trade. The improvements from its mouth to Paris are particularly extensive, while Rouen has been made a seaport by

deepening its channel and constructing immense wharves. Among the principal cities on the Seine are Paris, Le Havre, Rouen, St. Germain, Melun, and Fontainebleau, thus making the river important next to the Thames and the Hudson. Its entire basin has an area of 30,000 square miles, and it is navigable for a distance of 350 miles from its mouth.

SEJANUS. See Tiberius.

SELENIUM (sē-lē′nĭ-ŭm), a non-metallic element classed immediately between sulphur and tellurium. It was discovered in Switzerland by Jöns Jakob Berzelius (1779-1848) in 1817. Selenium is a rare element, occurring in composition with other minerals, especially silver, gold, copper, bismuth, and lead, but small quantities have been found in a free state in Mexico. When oxidized and dissolved by nitric acid, it yields selenious acid. It is obtained as a dark-brown, vitreous, and amorphous modification, or as a lead-gray crystalline mass, and is noteworthy for its variations as a non-conductor of electricity. Its resistance to electricity is less in the light than in the dark, on account of which it has various uses in electrical contrivances and the photophone. Tellurium is a non-metallic element of the same group as selenium. It is of rare occurrence, and is found either native or in combination with metals. Its resistance to electricity is similar to but less marked than that of selenium.

SELEUCIA (sĕl′ū-sĭ-ą), the name of seven cities in Asia, all of which were built in the early history of the dynasty of Seleucidæ. Two of these were particularly famous, both for their commercial importance and political power. The earliest was Seleucia Pieria, founded by Seleucus Nicator in 300 B. C. It was situated near the mouth of the Orontes, twelve miles west of Antioch, of which it was the seaport. During the war between the Ptolemies and the Seleucidæ for predominance in Syria it formed an important strategic point, but with the rise of Roman power declined rapidly. The excellent port is still in a state of preservation, but its magnificent walls, temples, amphitheaters, and citadel are in ruin or entirely destroyed. The only connection between the city and the sea was a tunnel cut through the solid rock, having a length of 1,087 yards. Seleucia-on-the-Tigris was the most celebrated of these cities, being for many years the eastern capital of the Seleucidæ. It was founded by Seleucus Nicator about thirty-five miles northeast of Babylon, and was built largely of material taken from the latter city, after that famous emporium had been ruined. Its growth was remarkable. In its greatest prosperity it had about 600,000 inhabitants, and formed the most important commercial center of Asia even to the time of Strabo. When western Asia was conquered by the Romans, it became the point of attack by the Persians, and was finally burned by Trajan in 116 A. D. At the time Emperor Julian made his expedition to the East he found the city entirely destroyed, and the country surrounding its ruins was the haunt of wild beasts.

SELEUCIDÆ (sē-lu-sē′dē), the dynasty of kings that succeeded Alexander the Great in governing a large part of western Asia. Their dominion included Syria, portions of Asia Minor, and the Eastern Provinces. The dynasty was founded by Nicator Seleucus (358-280 B. C.), who was a general under Alexander the Great, and after the death of the latter became satrap of Babylonia. A misunderstanding between him and Antigonus caused him to take refuge in Egypt in 316 B. C., where he secured assistance from Ptolemy, governor of Egypt, in taking the field against Antigonus, and he finally returned to his satrapy in 312 B. C. He conquered Media soon after and assumed the title of Seleucus I. in 306 B. C., thus founding the dynasty, and rapidly extended the borders of his kingdom from the Indus to the Oxus River. Four years later he formed an alliance with Ptolemy, Cassander, and Lysimachus against Antigonus, defeating the latter at Ipsus in 301 B. C., and in the general division secured Syria and portions of Asia Minor, but with the death of Lysimachus, king of Thrace, he annexed all of Asia Minor. He was assassinated in 280 B. C. by Ptolemy Ceraunus, and was succeeded by his son, Antiochus I. This king sought to make the East Greek, as his father had endeavored to do before him, but was killed in a battle with the Gauls, who had invaded Asia Minor in 261 B. C. He was succeeded by a number of kings bearing the name of Antiochus, Seleucus, and Demetrius, but of these Antiochus III., surnamed The Great, was the most noted. He was the first to come into collision with the Romans, and was defeated by Acilius Glabrio at Thermopylæ in 191 B. C. and soon after by Scipio. From that time the power of the Seleucidæ declined rapidly, being weakened by a loss of the kingdoms of Bactria, Armenia, Parthia, and Judæa, and the last small remnant was made a Roman province by Cneius Pompeius in 65 B. C.

SELIM I. (see′lĭm), sultan of Turkey, son of Bajazet II., born in 1467; died Sept. 22, 1520. He was of a warlike disposition and secured the support of the Janizaries, with whose aid he dethroned his father and became monarch on April 25, 1512. It was his policy to remove every possible obstacle that might rise against his power, and with that end caused the death of his father, brothers, nephews, and many others who might possibly aspire to the throne. He declared war against Persia in 1514. In the same year he invaded that country with an army of 250,000 men, and after defeating Shah Ismail at Chalderoon, annexed Kurdistan and Diarbekir to his dominion. He left

a part of his army in Asia and invaded Egypt, where he defeated the forces of the Mamelukes. His victorious army entered Cairo in 1517, where his chief opponents were put to death, and Egypt became incorporated with the Ottoman Empire. The last descendant of the Abasside caliphs of Egypt bestowed upon him the title of Imam and the standard of the prophet, and in consequence the Ottoman Sultan of Constantinople became the chief of Islam, as the legal representative of Mohammed. This distinction was soon after recognized by the sacred cities of Medina and Mecca, and his supremacy was acknowledged by the leading Persian chiefs. Though a fierce and cruel warrior, Selim was noted as a patron of literature and art. During his reign a powerful navy was built, the Janizaries controlled, and the dominion extended more than during the reign of any of his illustrious predecessors. He was succeeded by Solyman I.

SELIM III., sultan of Turkey, son of Mustapha III., born Dec. 14, 1761; died in 1808. He succeeded to the throne after the death of his uncle Abdul-Hamid, in 1789, and immediately adopted a policy favorable to improvement, but his plans were disturbed by wars with Russia and Austria in Europe and with the French in Egypt. Austria compelled him to cede Choczim in 1791, and Russia obtained all his possessions beyond the Dniester by the peace of Jassy in 1792. His progressive plans for clothing, arming, and disciplining his troops in the European fashion caused the dervishes to openly preach revolt, charging Selim with despising the holy injunctions of the Koran, and he was finally deposed by the Janizaries in 1807. In his reign many factories were established and internal improvements fostered, but an organized attempt to reinstate him on the throne in 1808 led to his assassination.

SELJUKS (sĕl'jūks), or **Seljooks**, the name of several Turkish dynasties, who descended from one family and governed large parts of Asia from the 11th to the 13th centuries. The dynasty was so named from Seljuk, a chief of a small tribe in Bokhara and the surrounding country, in the early part of the 11th century. His grandson, Togrul Beg, became the chief of a tribe that had migrated to northern Khorasan, and established his government at Nishapur. He subdued Balkh and Khaurezm in 1041 and Bagdad in 1055, and became the reigning monarch at the last mentioned city. Togrul Beg was a warm supporter of the Moslem faith, which led him to build numerous mosques and support pious and learned men. He was succeeded by his nephew, Alp-Arslan, in 1063, as ruler of Persia, who soon after conquered Palestine and Syria from the caliphs of Egypt, and in 1071 made Diogenes, emperor of Byzantine, a prisoner. As a ransom for Diogenes he received a large part of Asia Minor.

Alp-Arslan was succeeded by his son, Melek Shah (1073-1093), who is noted as the most powerful of the Seljuk monarchs. He not only solidified the empire, but annexed all of Asia Minor and Arabia, thus governing the extensive region lying between Chinese Tartary and the Hellespont. His reign was aided by the influence of his grand vizier, Nizam-ul-Mulk, who is noted for his progressive scholarship and friendship for learning. Many bridges, canals, highways, hospitals, and colleges at Herat, Bassora, Ispahan, and Bagdad attest the progressive spirit of that epoch. Smaller kingdoms began to form after the death of Melek Shah, the foundation for which had been laid by that ruler, since he established a number of principalities that were professedly subject to the center state of Iran or Bagdad. Saladin was one of the Seljuk chiefs, and as such came in contact with the Crusaders. Others like him began to assert their power until finally the monarchy became dissolved. The Mongols under Genghis Khan pressed the Mohammedans toward the west, and their dominion at length fell entirely, the Seljuk dynasty ending with Kaikobad in 1315. The Ottoman princes succeeded the Seljuks, both of whom were Turks, and thus the foundation for the Turkish or Ottoman Empire was laid.

SELKIRK (sĕl'kẽrk), **Alexander**, the prototype of Robinson Crusoe, born in Largo, Scotland, in 1676; died in 1723. He was the son of a shoemaker and tanner, whose name was Selcraig, and at an early age left home to engage in a seafaring life. In 1703 he became engaged as a buccaneer in the South Seas, and, being of a quarrelsome disposition, disagreed with his captain. In October of the same year he was put on the island of Juan Fernandez, where he remained a solitary resident for four years and four months, when he was rescued by Capt. Woodes Rogers, who made him commander of a privateering vessel. He returned to Scotland in 1712, but again went to sea, rising to the rank of lieutenant in the navy. A statue has been erected to his memory in his native town. Daniel Defoe made the experiences of Selkirk prominent in his "Robinson Crusoe," which he published in 1719, but this famous book contains many experiences drawn from imagination. See **Juan Fernandez.**

SELKIRK MOUNTAINS, an elevated mountain range in southeastern British Columbia. It belongs to the Rocky Mountains. The range is about 175 miles long, eighty miles wide, and lies immediately west of the Rocky Mountains proper. Mount MacDonald, height 9,945 feet, is the culminating peak. It has an abundance of valuable timber to a height of nearly 6,000 feet, but perpetual snow lies on the elevations exceeding 7,000 feet. The presence of vast snow deposits gives rise to large glaciers,

which in former times were even more extensive than at present, a fact evidenced by numerous moraines.

SELMA (sĕl'mą), a city in Alabama, county seat of Dallas county, on the Alabama River, forty-five miles west of Montgomery. It has important railroad and navigation facilities, is well platted and handsomely built, and in the surrounding country are rich cotton, lumber, coal, and iron productions. Among the manufactures are cotton-seed oil, ice, cotton-batting, lumber products, car wheels, cigars, fertilizer, machinery, and clothing. Its principal buildings are the county courthouse, two academies, numerous churches and schools, and the city hall. Electric lights, telephones, waterworks, and pavements are among the improvements. Population, 1900, 8,713.

SEMELE (sĕm'ĕ-lē), in Greek legends, a beautiful princess, the daughter of Cadmus, king of Phœnicia. She became noted because of the affection bestowed upon her by Zeus. Hera, the haughty queen of heaven, was jealous of her, and artfully persuaded her to insist upon Zeus visiting her in all his power and glory, well knowing that this would cause her instant death. When asked to grant a request, Zeus vowed by the Styx that he would accede to her wishes whatever they might be. Semele begged of Zeus to appear to her in all the glory of his divine power and majesty, and having vowed to do so, he was compelled to grant her wish, but she was immediately consumed in the flames of the lightning. However, her son by Zeus, who was called Dionysus, was saved and became the god of wine.

SEMINOLES (sĕm'ĭ-nōlz), an Indian nation of Florida, which was composed chiefly of Creeks, from whom they separated in 1750. They aided the British in the War of 1812, and subsequently gathered other Indians and Negroes until in 1818 they numbered about 4,000. Their invasions of Georgia and the destruction of property and life caused the government to send Gen. Andrew Jackson against them in 1818, who, after defeating them and destroying a number of their towns, captured Ambrister and Arbuthnot, two English adventurers, who were summarily hanged for inciting trouble with the Indians and the Spanish. Florida was annexed to the United States the following year. This caused many Negroes to join the Seminoles, and war ensued when the government decided to remove them to the west. A treaty in 1823 resulted in ceding most of their lands, and in 1832 the chiefs agreed that the tribe should be removed west of the Mississippi. Osceola stubbornly resisted removal, and became the leader in a destructive war that lasted seven years, from 1835 to 1842. He was captured treacherously in the latter year. In 1845 a treaty was concluded by which the Seminoles were removed west of the Mississippi, and in 1856 lands lying west of the region occupied by the Creeks were assigned to them. The Seminoles number about 3,000, and include many industrious farmers and manufacturers, and numerous scholars. They support a large number of churches, mostly Presbyterian, and are devoted to schools and learning.

SEMIRAMIS (se-mĭr'ą-mis), the queen of Assyria and Babylonia, and reputed one of the most powerful rulers of Asia. Tradition makes her a daughter of Derceto, the fish goddess of Ascalon, and of a Syrian youth. She was exposed to death by her mother, but was fed by doves and afterward found and adopted by the chief of the royal shepherds. Onnes, governor of Nineveh, was attracted by her beauty and made her his wife, but she won the love of King Ninus by a heroic exploit, the capture of Bactria, which had defied the forces of the king. Onnes hanged himself to give Semiramis freedom to become the wife of Ninus, but that ruler died soon and she was proclaimed queen of Assyria, ruling over that mighty empire forty-two years. She traveled in all parts of her dominion, founded Babylon, and made it the most powerful city in the world. In her reign stupendous monuments were built, highways opened, canals constructed, and large regions added to the empire, particularly Libya, Persia, and Ethiopia. The dates of her birth and death are extremely doubtful, being assigned by most writers between the years 2182 and 800 B. C. The Hanging Gardens of Babylon are attributed to her time, and there are other antiquities that give evidence of her long and successful reign. She was succeeded by her son, Ninyas. According to tradition she disappeared after assuming the form of a dove, and was long worshiped as a deity.

SEMITES (sĕm'ītes), the name of a group of nations. They are allied closely in physical features, language, and religion, and are regarded the descendants of Shem, a son of Noah. The peoples embraced in this group are distributed in many countries, but the region of their nativity is in Arabia, Syria, Chaldæa, Abyssinia, Phœnicia, Ethiopia, and Palestine. It is generally assumed that the first representatives were confined to Arabia about 4000 B. C., where they led a nomadic life, but later migrated into Mesopotamia. After dwelling for some time under the priest-government of the Turanians then occupying that region, they became identified with the ruling classes, and finally spread over large parts of western Asia and northern Africa. The cities of Tyre and Sidon are among the many emporiums founded by Semites, and for centuries they were the predominating power of that region of the world. The language differs from the Aryan, and the different Semitic nations have kept closer together and undergone less change than the Aryan peoples.

Properly there are two divisions of the ancient dialects, one being generally known as the northern and the other as the southern Semitic languages. The northern dialects comprise those spoken in ancient Assyria and Babylonia, together with the tongues of the Hebrews, Phœnicians, Carthaginians, Chaldæans, Aramaians, and Syrians. They are nearly extinct as spoken tongues, Hebrew being the only one used at present in writing. To the southern Semitic tongue belong the Arabic, Amharic, Ethiopic, and the Himyaritic. Ethiopic was anciently the language of Abyssinia, but it has given way to Amharic and other modern tongues. The Arabic language is used most extensively of the Semitic tongues, and includes the four spoken dialects of Egypt, Barbary, Arabia, and Syria. Among the marked peculiarities of the Semitic languages is the triliterality of the roots, these consisting of three consonants, and the inflection by means of internal vowel change. It is peculiar for its absence of compound words.

The Semitic people are distinguished for their worship of one God, and they are the early teachers of three religions embracing the doctrine of one Deity, namely, the Jewish, Christian, and Mohammedan. Through them the Bible and Koran were given to the world, and they also distinguished themselves in literature and arts, and many of the sciences. It was from Phœnicia that commerce and western colonization spread, while the powerful Carthaginian empire sent forth its Hannibal, and the Babylonians and Assyrians reared mighty empires and cities of great wealth. The Phœnician alphabet is not the oldest, but from it came most of the alphabets of Asia and Europe, while the system of notation in common use is from the Arabic. To them must be credited the preservation of learning while the Dark Ages spread their shadow over Europe, and their sacred books and cities are still the attraction of thousands.

SEMMES (sĕmz), **Raphael**, naval officer, born in Charles county, Maryland, Sept. 27, 1809; died Aug. 30, 1877. He studied law and entered the navy. Subsequently he took part in the Mexican War, and in 1859-61 served as secretary of the lighthouse board. He resigned that office at the beginning of the Civil War to enter the Confederate navy, and became commander of the steamer Sumter. With it he captured eighteen merchantmen and sailed to Europe, but the steamer Tuscarora pursued and finally blockaded him at Tangier, Morocco. He sold his ship to evade capture, and in 1863 returned to the United States in command of the famous Alabama, a steamer built and manned in England. With that vessel he captured sixty-two merchant vessels and destroyed the gunboat Hatteras off Galveston, but was pursued by the Kearsarge and his vessel sunk off the harbor of Cherbourg, France, June 19, 1864. He escaped on a British vessel and returned to the United States, was soon after made rear-admiral in the Confederate navy, and commanded the water approaches to Richmond. In 1865 he joined General Johnston in the capitulation at Greensboro, North Carolina. Subsequent to the war he practiced law at Mobile, where he was arrested in 1865, but released after several months' imprisonment. Afterward he became editor of a daily paper at Mobile, and later professor in the Louisiana Military Institute at New Orleans. The Alabama Claims originated from his career of destruction. He published "Campaign of General Scott in the Valley of Mexico;" "Memoir of Service Afloat During the War Between the States," and "The Cruise of the Alabama and Sumter."

SEMPACH (sĕm'päk), a town of Switzerland, in the canton of Lucerne, on the east shore of Lake Sempach. It has a population of 1,250, and would be of little more than local interest but for the decisive battle that occurred there on July 9, 1386, in which the Swiss gained a decisive victory over the Austrians. The Swiss army of 1,300 was under command of Arnold von Winkelried, and the Austrian army of 5,400 was under Duke Leopold. The Swiss army made a desperate attack and totally defeated the Austrians, who lost 2,000 troops and 600 nobles, while the Swiss lost only 200 men. A chapel marks the site of the battlefield. Its anniversary is still celebrated with imposing ceremonies in Switzerland.

SENECA (sĕn'e-ka), **Lucius Annæus**, noted philosopher, born in Cordova, Spain, in the year 3 B. C.; died in 66 A. D. He was the son of Marcus Annæus Seneca (61 B. C.–37 A. D.), a celebrated rhetorician, who taught rhetoric with success in Rome in the time of Augustus. Seneca the Philosopher, as the younger was called, was taken to Rome at an early age, where he studied eloquence, philosophy, and law, but left the bar because Emperor Caligula threatened his life. He entered public life soon after, and in filling the office of quæstor rose to high favor with Emperor Claudius, but he was banished in 41 A. D. on a charge of intimacy with Julia, a niece of the emperor. In 49 he was called to the Roman capital, where he became prætor and afterward tutor to Emperor Nero, who, on ascending the throne, made him a consul in 57. It may be said that the influence of Seneca was highly potent in the bright years of Nero's reign, but when the emperor became tainted with crime and corruption he came to dislike his former tutor.

Seneca vainly petitioned the emperor to allow him to retire from office, offering at the same time to bestow upon him his large fortune, but the emperor had planned to cause his death. An attempt to poison him failed, but he soon after caused him to be charged with being implicated in the con-

spiracy of Pisa, and was condemned to put himself to death. Seneca chose to die by bleeding, and accordingly cut several veins of his arms and legs. He is the author of many excellent works, among them treatises on "Anger;" "Steadfastness of the Wise Man;" "Providence;" "Tranquillity of Mind," and "Clemency." The last mentioned was addressed to Nero. Other writings include "Consolatio ad Helviam," a letter of consolation addressed to his mother; "Consolatio ad Polybium," a letter consoling Polybius on the loss of his brother; seven books on "Investigations of Nature;" seven books on "Benefits," and eighteen books of moral letters. Many tragedies are attributed to him, all of which are remarkable for beauty of style, but they are inferior as productions for the stage.

SENECA FALLS, a town of Seneca county, New York, on the Seneca River, ten miles northeast of Geneva. It has good railroad facilities, and is surrounded by a country containing deposits of gypsum and building stone, and picturesque lakes. The adjacent country is fertile, yielding grasses, fruits, and cereals. The manufactures are machinery, flour, cotton and woolen goods, and lumber products. It has good schools, an academy, and electric railway communications with neighboring towns and cities. Population, 1900, 6,519.

SENECA LAKE, an elongated body of water in New York, lying between the counties of Seneca, Ontario, Schuyler, and Yates. Its length is thirty-five miles, width from one to four miles, and its elevation 247 feet above sea-level. The greatest depth is 630 feet, and its shores are picturesque and in many places quite abrupt. It is important for its fisheries and navigation facilities, being connected with the Erie Canal. The Seneca River issues from its northern end, which with the Oswego River carries the drainage to Lake Ontario.

SENECAS (sĕn'ē-kăz), an Indian tribe of the Iroquois family, formerly resident in western New York, where they became allied with Pontiac. They favored the English during the Revolution, but made peace with the Americans in 1784. In 1812 they joined the Americans, but a small part became allied to the hostile tribes of the west, though peace was concluded with them in 1815. This band was removed to Indian Territory in 1831, but about 2,750 Senecas are still on reservations in New York.

SENEGAL (sĕn-ę-gal'), an important river of western Africa, which rises on the northern slopes of the Kong Mountains, near the sources of the Niger, and after a course of about 1,000 miles flows into the Atlantic near St. Louis. It receives an important tributary at Bafulabe, which is connected with Kayes by railway to overcome a number of falls, and from the latter town it is navigable to its mouth, a distance of nearly 700 miles. In its lower course are many branches leading from the main channel, thus forming numerous fertile islands, but materially lessening its importance for navigation by the larger vessels. A large portion of its basin has productive soil. Considerable timber prevails along its banks.

SENEGAL, a French colony in western Africa, situated in Senegambia, and comprising the coast region from a point somewhat north of Cape Verde to the British colony of Gambia. It includes the island and town of St. Louis at the mouth of the Senegal River, and a region extending inland from the coast equal to about 200,000 square miles. Its population is placed at 3,200,000. This region was first settled by the French in 1637, and is made the base of operations politically and commercially for all of Senegambia, which see.

SENEGAMBIA (sĕn-ę-găm'bĭ-a), an extensive colonial possession of France in western Africa, lying south of the Sahara, west of the Soudan, north of Guinea, and east of the Atlantic. It includes the colony of Senegal and a number of protected states, the whole comprising 415,800 square miles and a population of about 12,000,000. French claims to this vast territory date from 1637, when they made settlements near the mouth of the Senegal River, and since then have been enlarging their sphere of influence toward the interior. Within recent years their claims have been extended to include the territory from the Mediterranean to the Gulf of Guinea, west of Tripoli and Lake Tchad, except only Morocco and Spanish territory on the west coast and portions of the coast from British Gambia to the Niger Territories. The portion of this region included in Senegambia is governed from St. Louis, its local capital, where the governor-general has his seat. He is assisted by a colonial council and is represented in Paris by a deputy. St. Louis, Dakar, Kayes, Bakal, and Bafulabe are the principal trade centers.

The region lying along the Atlantic coast is generally low and swampy, the flat country extending inland from 100 to 200 miles. There is a general rise from these low plains toward the east, terminating in mountain ranges that extend south of the Senegal River, and between the headwaters of the Senegal and the Niger. The Kong Mountains are the most important highlands, rising to elevations about 3,500 feet above sea-level, and between them and the coast regions is a lofty and more or less undulating plain. Thus the region may be divided into Low, Middle, and High Senegambia; all of them are more or less important commercially. Low Senegambia is noted for its fertility of soil, and produces large quantities of cereals and fruits. Middle Senegambia is inhabited by numerous Negro tribes. It has a hot climate, fertile soil, and yields fruits, timber, and domestic animals. High Senegambia is inhabited largely by Moors,

who are adherents of the Mohammedan faith Many wild animals infest various parts of Senegambia, including antelopes, hippopotami, elephants, lions, panthers, leopards, hyenas, crocodiles, and monkeys. The climate of many sections is unhealthful for Europeans, particularly those lying near the marshy regions. Among the chief exports are yams, rice, maize, bananas, oranges, citrons, timber, and minerals. The French are pushing vigorously the policy of introducing the rearing of domestic animals, and the culture of all kinds of fruits, vegetables, and cereals. They are constructing railroads and improving the rivers by dredging and canals. The more important streams are the Senegal, Gambia, Nunez, Niger, and Rio Grande, all of which are of more or less importance commercially. In their basins are vast forests of palm, mangrove, baobab, teak, and other tropical trees. The most important railroads include a line from Dakar to Rufisque and St. Louis, and another from Kayes on the Senegal to Bammuko on the Niger. The latter connects the navigation of the two river systems.

SENNA (sĕn'nȧ), the dried leaflets of several species of cassia, plants belonging to the bean family. These plants are native

SENNA.
Flower and Seeds.

to northern Africa, western Asia, and southern Europe, particularly to Arabia, Tripoli, and Egypt. Several allied species are native to the eastern United States, where they are known as wild senna, and the leaflets are used as a mild cathartic. Senna has long been employed in western Asia as an important medicine. Its use was introduced to Europe by Arabian physicians in the 9th century. The dried leaves are now a staple drug, and yield medicinal properties useful in the treatment of numerous ailments, serving as a purgative and as a confection.

SENNACHERIB (sĕn-năk'e-rib), king of Assyria, son of Sargon, whom he succeeded on the throne in 702 B. C., and reigned until his death in 681 B. C. Among the notable events of his reign are the suppression of two revolts of Babylonia, and successful wars against Ethiopia, Egypt, Armenia, Phœnicia, and Media. After a general invasion of Judah, he carried 200,000 Jews into captivity, and required King Hezekiah to pay tribute money into his treasury. Hezekiah revolted against his oppression the following year, which brought on a second invasion of Judah. After marching through Palestine, he besieged Libnah, where an angel of the Lord is said to have slain 185,000 of his Assyrian warriors, and he was compelled to make a hasty retreat to Nineveh. His reign of twenty-two years was eminently successful, and witnessed the building of many palaces, monuments, canals, and highways. His improvements are mentioned with equal favor in the Scriptures, by Josephus, and by the Greek historian Herodotus. The most elaborate palace was that at Koyunjik, which covered an area of eight acres and contained many rare sculptures.

SENSATION (sĕn-sā'shŭn), a cognized affection of the nerves, or a modification of consciousness that results when some organ of sense is excited by external stimuli. The five organs of the senses, namely, the eye, the nose, the ear, the tongue, and the nerves that give rise to the sense of feeling or touch, are the end-organs by which impressions are primarily received and thence transmitted to the brain. By means of these organs we become aware of light, sound, heat, mechanical pressure, color, scent, etc. Besides these some writers, as Professor Bain, add a sixth sense, that of muscular resistance. This sense is more than feeling, as in the case of lifting a weight one not only feels its surface, but experiences the sense of something resisting muscular effort. Perception by the senses is the basis of all our knowledge or mental activity. It is probable that a child deprived of all his senses would give no evidence of possessing a mind. The first mental act is attended or preceded by a cognition of impressions on the nerves; that is, the first thing one is conscious of is a sensation. The sense of touch or resistance is the most widely diffused, and the sensations arising from it are most readily perceived by animals. The others follow in the order named—sight, taste, hearing and smell. See articles on the organs of the senses, Eye, Ear, etc.

SENSITIVE PLANT, the common name of a shrubby plant of the bean family, which is native to tropical America. It attains a height of about one foot, has pinnate leaves, and bears small purple flowers in heads on long peduncles. This plant is remarkable for possessing a vegetable irritability, causing it to shrink from touch or disturbance.

If a leaflet be touched it folds rapidly, and if a branch is shaken all the leaflets curl up and the branch bends toward the main stalk. In Panama it has been observed that a railroad train causes the leaves to fold when passing rapidly by a cluster of these plants. Several species possess the property of folding their leaves on the approach of night, and unfolding them at the return of light. These plants are cultivated quite extensively in hot-houses.

SEOUL (sä-o͞ol′), the capital of Corea, on the Han River, about twenty-five miles by road from the Yellow Sea. It is situated in a valley between mountains, and around its outskirts is a stone wall. Seoul has only two wide and improved streets, all the remainder being about twelve feet wide and destitute of pavements and sidewalks. The architecture is mostly of wood, the buildings are covered with thatched roofs, and in the narrow streets are gutters for the escape of refuse matter, which is carried off by a shallow stream of water. The most important buildings include those of the government, which are situated within the city but separated from the remainder by a secure wall. Manufactures are in a rude and very primitive state, the most important being clothing, mats, paper, tobacco, silk textiles, fans, and utensils. Seoul was founded in 1397 and became the capital in the latter part of the 16th century, but was sacked by the Manchus in the 17th century. It was closed to foreigners until within recent years, and there is still a strong prejudice against foreign visitors and modern improvements. Japanese troops occupied it in 1894 as a result of the war between China and Japan. Population, 250,775.

SEPOY (sē′poi), the name of native Hindu soldiers, which is used to distinguish them from the white or gora soldiers employed by the British. Efforts to train natives of good caste for the army were first made by the East India Company in the 18th century, who allowed them to use the sword and target instead of the musket, and to wear the turban, vest, and long drawers in place of regular uniforms. It was found that these soldiers rendered good service both in the English and French armies, facing danger with firmness and obstinacy. Soon after their number was increased, until in 1857 the Sepoys in the British service numbered 240,000, and the total army in India was only 300,000. In that year the high caste Hindus in the Bengal army incited the famous Sepoy Rebellion, which cost the British government many lives and fully $200,000,000. The Sepoy soldiers in the British service at present number 140,000 officers and men, this being about two-thirds of the present British army in India.

SEQUOIA (sē-kwoi′ȧ), the name of a genus of gigantic trees of the pine family, nearly allied to the bald cypress of the southeastern United States, and so named from the Indian chief Sequoiah, who invented the Cherokee alphabet. There are only two chief species, the redwood and the mammoth, both of which are native to California. The mammoth may be regarded the largest of trees, since it attains a height of more than 300 feet

A SEQUOIA TREE.

and a diameter exceeding thirty feet. Some of the eucalyptuses of Australia attain a greater height, but contain a considerably smaller bulk of wood, since the trunk is much smaller in girth. The sequoia trees are found mostly in groves in the Sierra Nevada Mountains, and range from Calaveras county, California, toward the south and southwest about 200 miles. Among the famous groves is that known as the Mariposa Grove, sixteen miles south of the Yosemite Valley. It contains about one hundred giant trees measuring forty feet in circumference, and several others measuring about ninety feet. The largest of the trees in this grove is called the Father of the Forest, which has been broken for many years, but its trunk is still 300 feet long and has a diameter of forty feet. The Mariposa Grove is government property and these trees are preserved as remarkable wonders of nature. The wood is soft and white when felled, but turns red afterward and is very durable. It is evident that some of the larger trees now living range in age from 2000 to 3000 years.

SERAGLIO (sĕ-răl′yō), the old palace of the sultans at Constantinople, built by Mohammed II. on the site of the old acropolis. It is situated on an eminence that overlooks the sea, and its enclosing wall has a length of fully nine miles, within which are beautiful gardens, mosques, official buildings, and the harem. It has ample accommodations for 20,000 persons. The seraglio is not used at present as the residence of the sultan.

SERAPIS (sĕ-rā′pĭs), or **Sarapis**, an ancient god of the Egyptians. This god

was introduced in the time of Ptolemy I., who worshiped him with imposing honor. Plutarch and Tacitus relate that Ptolemy saw the image of a god in a dream, and was commanded to remove it from its place and bring it to Alexandria. Accordingly he sent an expedition to Sinope under the direction of a famous traveler, whence a colossal statue, originally made to represent Jupiter, was brought to Alexandria and declared to personify the god Serapis. The name Serapis was derived from Osiris and Apis, and is said to have been the appellation given to the bull Apis after death, at the time it was made a god. The statue of Serapis was set up in a splendid temple at Alexandria known as the Serapeum, to which was afterward joined the celebrated library of Alexandria. This temple was the last place of security held by the pagans when Christianity was introduced, and the worship of Serapis ceased with the destruction of the image by the Christian archbishop in 398 A. D. as ordered by Theodosius. Recent excavations at Memphis and other ancient cities have brought to light numerous remains of statues built to this deity. Various writers recount that forty-two temples were built to his honor, but worship in them was largely confined to the Greeks and Romans, the Egyptians as a class never admitting him as a sacred deity.

SERF, a person whose service is attached to the estate on which he lives and with which he may be transferred. Serfdom had a wide foothold in Europe during the Middle Ages under the feudal system, when the condition of serfs was not exactly that of slaves, but resembled it in many respects. Three principal classes of laborers were maintained in most European countries, the freemen, the villeins, and the serfs. Villeins occupied a middle position between the other two classes, and could with considerable ease become freemen, but a serf could become free only by purchase or extended military service. However, serfs were not regarded personal or chattel property like slaves, but they could be transferred with the property to other owners. The serfs gradually decreased in number as the conditions of manumission became easier under the general spread of education, and with the adoption of systems that led to social and industrial evolution. Serfdom existed in Scotland as late as the 18th century. The tenant practice prevalent in Ireland is little better than a mild form of serfdom—a condition that may not be overcome until the tillers of the soil become enabled to own the land instead of being required to rent it. Russia abolished serfdom on March 17, 1861, a proclamation being issued at that time by Alexander II.

SEROUS MEMBRANE (sē′rŭs), a delicate tissue in the human body, composed of flattened endothelial cells, and normally moistened on the interior side by a serous fluid. It forms a covering or sac around certain organs, serving to allow free-organ action, and is associated with an absorbent system. The chief serous membranes are the two pleuræ, enclosing the lungs; the pericardium, surrounding the heart; the peritoneum, lining the abdominal cavity; and the arachnoid, forming the middle of the three membranes enveloping the brain and spinal cord. The diseases to which these membranes are subject include dropsical effusions, morbid growths, hemorrhage, and inflammation, such as pericarditis and pleurisy.

SERPENTINE (sĕr′pĕn-tīn), a mineral composed of magnesia and silica. It is widely distributed in all parts of the world. Serpentine occurs in all geological ages, and forms large beds of primitive rock. The presence of iron and other impurities give it a great variation in color, which ranges through different shades of purple, red, green, yellow, brown, gray, and sometimes marbled and mottled. It takes a high polish, and is used in making ornamental articles, such as vases, boxes, and pillars. Serpentine may be divided into two general varieties, known as common and precious serpentine. The common class occurs as a rock. It is usually soft, easily broken, and has serpent-like veins. Precious serpentine is the harder and more beautifully colored, but is of quite rare occurrence. Fine deposits of serpentine rock occur near Baireuth, Germany; in the Shetland Islands, Corsica, and different sections of the United States.

SERPENTS. See **Snakes.**

SERPENT WORSHIP, or Ophiolatry, a form of religious worship. It dates from remote antiquity, and is still practiced to a considerable extent in India and among many savage and semi-civilized peoples. Serpent worship is considered quite closely associated with tree worship, which, as a form of religion, rose from the fact that most races of mankind at a certain stage of mental development held the view that trees are the residences or embodiments of spirits or deities. Both are forms of nature worship, against which stern denunciations were made by the Jews, and in classical mythology there is wide mention of sylvan deities, elves, and fairies more or less associated with serpents and trees. Homer mentions the appearance of a serpent at the siege of Troy as an omen of victory to the Greeks, while Plutarch speaks of Alexander as having come from a serpent race. The Zulus of South Africa bring snakes into their homes, giving them the most devoted protection. Many of the American Indians practice serpent worship in various forms. These are only a few instances of many that may be named. The practice of worshiping serpents of different kinds and looking upon them as indicating good or evil, or possessing god-like power, is as old as human history. In India it is connected with Buddhism, even

among the higher castes, but as a general rule the practice prevails most extensively among the less intelligent peoples.

SERPULA (sẽr'pū-là), a remarkable genus of sea-worms. They belong to the tube order. Their tubes are of calcareous formation, by which they are attached to shells or rocks at the bottom of the sea, and some species live in groups with their tubes intertwined. The animal protrudes its head from the wider end of the tube, but on the slightest alarm withdraws completely into the opening. Many species have been described. Some have highly colored and curiously formed shells. They are extremely sensitive to light, but possess no eyes.

SERVIA (sẽr'vĭ-a), a kingdom of southern Europe, bounded on the north by Austria, east by Roumania and Bulgaria, south by Turkey, and west by Austria. It has an area of 19,050 square miles, and is one of the more important kingdoms of the Balkan region. The surface is generally mountainous, being traversed by ranges of the Carpathian Mountains in the northeast, Dinaric Alps in the west, and Balkans in the southeast. The drainage is wholly toward the Save and Danube rivers, which form the northern boundary. Swampy plains extend along the Save and Danube in Servia. Among the principal streams are the Drina, Morava, Bugarski, and Nissava rivers, all of which have a northerly course. The highest elevations are in the Rudnik Mountains, a chain belonging to the Carpathians, which are situated near the center of the country. Its highest peak is the Great Schturaz, height 3,375 feet. Servia has an abundance of timber, both in the valleys and on the mountain slopes, and the soil is generally fertile. Though mining is still in a primitive state, some progress has been made recently in utilizing the deposits of copper, silver, lead, iron, coal, quicksilver, and building stone, all of which abound in considerable quantities. The climate is temperate, ranging from a mild form in the valleys and plains to a rigorous and colder in the higher regions.

Agriculture is at present the most important industry, the productions including wheat, maize, hemp, flax, tobacco, and vegetables. Many varieties of fruit, especially pears, prunes, grapes, apples, and peaches, are grown. Stock-raising is carried on successfully, including horses, cattle, swine, sheep, goats, and poultry. The chief manufactures are carpets, jewelry, embroidery, hardware, machinery, clothing, and utensils. The exports include cereals, wine, wool, livestock, and lumber; and the imports, sugar, cotton, and machinery. Austria and Germany have long had special trade advantages, largely from the fact that the only transportation facilities by water are by way of the Danube and tributary rivers and canals. Railroad building has been encouraged materially, and there are now 475 miles in operation, while the navigable waters in the Danube, Drina, and Save rivers supply an additional transportation system of 300 miles. Servia has important lines of telegraphs and telephones, and an efficiently managed postal system.

The government of Servia is a constitutional monarchy, and the king holds his office by right of inheritance. He is assisted by six ministers, but has large powers in executing the laws and filling the functions of supreme ruler. The national legislature is called the skupshtina, whose membership is elected by the people, and in it is vested the power to approve or reject laws proposed by a council of state. All males over twenty years of age are obliged to serve actively in the army for two years, and thereafter short periods annually in the reserve. This gives the nation a total war strength of 225,000 men, and a regular army of 20,000 men. It has no navy, but a number of the principal towns are strongly fortified. Greek Orthodox is the state religion, and is controlled by the minister of education and public worship. Practically all Servians belong to the state church, but other faiths are tolerated. A national system of education is maintained, and attendance at the common schools is compulsory. Admittance is alike free to all in the institutions of higher learning. The school system includes elementary and secondary schools, with articulated higher institutions, among them colleges of agriculture, law, medicine, theology, sciences, and military science.

The Servian language is sometimes called the Illyrian, and forms one of the four divisions of the Slavonian tongue, but it is more closely allied to Russian than to Bohemian or Polish. Commercial intercourse with the Italians and adherence to the Greek religion have influenced the language by incorporating a number of Italian and Greek terms, but the dialect has been preserved with remarkable distinctness. It has a considerable literature, mostly poetry and works on theology. Among the most eminent of Servian writers is George Brankovitch (1645-1711), who wrote "History of Servia," a work that records the national events from the origin of the nation to his own time. Little advance was made in the culture of the language until Vuk Stephanovitch, in 1814, published his "Grammar of the Servian Language." He gathered the best poetic productions in the Servian and published them under the title of "Songs of the Servian People." There is a long list of recent writers in law, lyric and dramatic poetry, jurisprudence, history, and theology. The revival of interest is due to liberation from Turkish rule and a more general spread of education. The Servians are noted for their love of freedom and personal valor, and they comprise one of the most gifted and progressive classes of the Slavonian peoples.

The history of the region now occupied by Servia dates from the early historic period

of Europe. It was anciently inhabited by Thracian or Illyrian races, who became subject to the Romans shortly before the Christian era, and was formed into the province of Mœsia. With the decline of Rome it was successively occupied by the Huns, Ostrogoths, and Lombards. About the middle of the 6th century it reverted to the Byzantine emperors, but in the next century it came into the possession of the Avares. In 638 the Servians moved from the slopes of the Carpathians into Servia and Bosnia, where they became converted to Christianity, and soon after united with the Byzantine rulers to expel the Avares. Their settlements were greatly extended toward the northwest, and about 1060 Michael Bogislav succeeded in expelling foreign claimants and assumed the title of king, receiving at the same time recognition from Pope Gregory VII. Successive wars to maintain independence terminated successfully, and in 1165 Stephen Nemanja founded a dynasty that prevailed two centuries. Stephen Dushan (1336-56) was the most distinguished monarch of the Nemanja dynasty. He succeeded in defending his dominion against foreign opposition, united under his government the countries of Macedonia, Bulgaria, Thessaly, and Albania, and successfully maintained independence of the advancing Turks. After his death the Turks became more successful, and Lazar I., who had founded a new dynasty in 1375, was not only defeated in the decisive battle of Kossova in Albania, in 1389, but was slain.

The country kept up a form of independent existence until 1459, when it became a Turkish province under Sultan Mahmud, to remain under Turkish control nearly 200 years. In the meantime it was the scene of many bloody contests between the Turks and Hungarians. In 1718 the greater part of Servia became tributary to Austria by the peace of Passarovitz, but the treaty of Belgrade, in 1739, ceded the territory back to Turkey. Turkish oppression brought on a number of insurrections. The first of these occurred under the leadership of Czerny George in 1804, who, with the aid of Russia, expelled the Janizaries. The peace of Bucharest, May 28, 1812, established the independence of the country. War broke out anew in 1813 and terminated successfully for the Turks, while Czerny George became a refugee in Austria. Milosh Obrenovitch united all of Servia in arms in 1815, and after a long and disastrous war attained victory, being elected prince in 1829. He was compelled to abdicate in 1839 in favor of his son, Milan, who was shortly after succeeded by his brother, Michael, but the latter was forced to abdicate in 1842. Alexander Kara-Georgevitch, son of Czerny George, was elected prince, but being a weak ruler he was compelled to abdicate in 1859. Milosh Obrenovitch was recalled, but died soon after and was succeeded by his son, Michael, in 1860, who was assassinated on July 10, 1868, by partisans of Prince Alexander. Milan Obrenovitch, grand-nephew of Milosh, became prince, and in 1876 joined Herzegovina and Montenegro in a war against Turkey, but the Servian forces were defeated in the decisive battle at Alexinatz.

In 1877 Russia declared war against Turkey, and after the fall of Plevna in the same year the Servian forces rallied to the support of the Russians. The treaty of peace concluded at Berlin on July 13, 1878, gave Servia its independence, and in 1882 a kingdom was erected with Milan I. on the throne. This sovereign abdicated in favor of his son in 1889, and died in Vienna, Austria, Feb. 11, 1901. His son succeeded him under a regency as Alexander I., and on April 13, 1893, took full charge of the government. He was assassinated in 1903 and Peter Karageorgevitch was proclaimed king. Belgrade is the capital and largest city. The inhabitants include about 35,000 Gypsies and 150,000 Roumanians. The total population is given at 2,341,600. A large number of Servians have homes in other countries. It is estimated that there are 250,000 Servians in Montenegro, 1,325,000 in Herzegovina, and 2,340,000 in Austria-Hungary.

SESAME (sĕs'ȧ-mē), a genus of plants, many of which are cultivated for their seeds in Asia and Africa. The common sesame is of the herb order. It grows to a height of from two to three feet, has opposite leaves, and pinkish or yellowish flowers. The seeds are valuable, yielding the so-called gangli oil. This product has a sweet taste. It is used for food, lighting, and oiling, and will keep for many years without becoming rancid. It is used in some countries as salad oil and in preparing cosmetics. The leaves of the plant yield a gummy substance used for poultices and preparing a light drink.

SESOSTRIS (se-sŏs'trĭs), the name given by the Greeks to a famous king of Egypt, who is supposed to have reigned for sixty-six years, beginning about 350 B. C. Early Greek writers assert that he divided Egypt into thirty-six districts and placed his brother as regent over them, and that he personally conducted a vast army into Libya, Arabia, India, Asia Minor, and finally Europe. They assert that he subdued Ethiopia, placed a large fleet on the Red Sea, and made the islands south of Asia subject. Many of the magnificent temples are assigned to him. He is thought to have been the builder of a wall 187 miles long at the border of the Libyan Desert, and of many obelisks or columns on which historic views of his conquests were engraved. These and other improvements were built by captives that he brought to Egypt from the conquered lands. According to some accounts, he became blind and decrepit in his old age, and took his own life. Some writers identify the exploits assigned to Sesostris as those accomplished by Rameses II.,

while others regard the name as personifying the achievements of several consecutive monarchs of Egypt.

SETON-THOMPSON, Ernest, artist and author, born in South Fields, England, Aug. 14 1860. He spent his boyhood in the woods of Canada and on the plains of New Mexico, which enabled him to acquire an extensive knowledge of wild animal life. Subsequently he studied in Toronto and London, completed a course in art at Paris, and served as naturalist to the government of Manitoba. He wrote and illustrated "Birds of Manitoba;" "Biography of a Grizzly;" "Art Anatomy of Animals;" and "Wild Animals I Have Known."

SETTER, a breed of dogs originally trained to indicate the presence of game-birds by crouching close to the ground, but now usually taught to stand rigid like a pointer. Russian setters have woolly fur and a bearded muzzle, and are noted for their keen scent. The English and Irish setters have narrow muzzles, long ears, silken hair, and a quick, keen eye. The Scotch or Gordon setter received its latter name from the duke of Gordon, who in 1800 bred a number of these dogs. Its color is a rich black, with tan on the legs, face, and chest.

SEVEN SLEEPERS, in legendry, seven Christian youths of Ephesus, who escaped the persecution of Decius by finding safety in a cave. There they were afterward found by the enemy, who walled up the entrance to the cave with great stones, that the Christian youths might die of hunger. Instead of succumbing to starvation, they fell into a deep sleep and in future generations were entirely forgotten. It is supposed that they were inclosed in the cave in the year 251, and awakened by some shepherds of Ephesus, who were seeking shelter for their cattle, in 447 A. D. One of their number was immediately sent to buy bread and other articles of food, but on reaching the village became astonished that the cross had been raised in many places and a different civilization confronted him than he had ever before experienced. On offering to pay the baker with a coin of Decius instead of one bearing the imprint of Theodosius II., who had in the meantime become king, he was placed under arrest, but released on showing the officers the cave where he and his six companions had slept for 196 years. Theodosius hastened to the spot in order to confirm the report, and was impressed with the truth of the resurrection of the dead. The Seven Sleepers relapsed into a deep sleep immediately after conversing with Theodosius, to be awakened only on the resurrection morn. June 27th has been consecrated to their memory by several Christian churches. A similar legend is current among the Mohammedans.

SEVEN WISE MEN, or **Seven Sages of Greece,** the designation applied to a number of Greek sages, who were devoted to the cultivation of practical wisdom. They lived about 620-548 B. C. Writers attribute to them a number of maxims of prudence and morality, but there is no uniformity among the ancients either as to the names or the sayings of these sages. The list of names and characteristic sayings are usually given as follows:

Bias of Priene in Caria—"Too many workers spoil the work."
Chilon of Sparta—"Know thyself."
Cleobulus of Rhodes—"Moderation is the chief good."
Periander of Corinth—"Forethought in all things."
Pittacus of Mitylene—"Know thy own opportunity."
Solon of Athens—"Nothing in excess."
Thales of Miletus—"Suretyship brings ruin."

SEVEN WONDERS OF THE WORLD, the name applied by ancients to seven monuments, all of which possessed remarkable splendor or magnitude. The term originated in Greece after the time of Alexander the Great, and Philo of Byzantium made them the subject of a descriptive work. These structures included the Hanging Gardens of Semiramis at Babylon, the Pyramids of Egypt, the Temple of Diana at Ephesus, the Colossus of Rhodes, the Pharos of Alexandria, the Statue of Jupiter at Athens by Phidias, and the Mausoleum at Halicarnassus.

SEVEN YEARS' WAR, the famous contest for the possession of Silesia. It was waged by Empress Maria Theresa of Austria against Frederick the Great of Prussia, and continued from 1756 to 1763. Silesia had previously belonged to the Austrian dominions, but was annexed to Prussia at the time of the war for succession to the throne of Austria, and in 1756 the empress took advantage of the circumstance that Frederick the Great was opposed by a number of European powers. She formed an alliance with France and Russia, while Frederick was supported by four of the smaller German states and England. The first decisive battles were fought in Saxony in 1756, when Frederick occupied Dresden and other chief cities of that region. The war continued with varying success, Frederick holding out bravely against an immense opposing army until the death of Empress Elizabeth of Russia, in 1762, when Peter III. ascended the throne. This sovereign was a great admirer of Frederick. He immediately restored East Prussia to him and sent an army of 15,000 men to his assistance, thus turning the tide in favor of Prussia. The last decisive battle was fought at Wilhelmsthal on June 24, 1762, when the French were defeated and surrendered to the allies of Prussia. War was terminated by the peace treaty of Humbertsburg on Feb. 15, 1763, which confirmed the title of the Prussian throne to Silesia. A part of this extended war was carried to India and America by the French and English, the latter phase of it being known in American

history as the French and Indian War. The result was that France lost all of Canada and decided advantages in India.

SEVERN (sĕv'ẽrn), an important river of western England, the second largest of that country, being exceeded only by the Thames. It rises in the mountains of Wales, and after flowing northeast to Shrewsbury it assumes a circuitous course toward the southwest and flows by a wide mouth into Bristol Channel. Its total length is 210 miles, of which 180 miles are navigable, and its basin has an area of 8,575 square miles. Extensive improvements have been made to Worcester, and several extensive canals enlarge its commercial importance. It receives the waters from the Tern, Teme, and Avon rivers. Its valley is fertile and is the seat of many manufacturing cities.

SEVERUS (sẽ-vẽ'rŭs), **Alexander**, Roman emperor, born at Arca, in 205; slain in 235 A. D. He was of Syrian parentage and originally named Alexius Bassianus, but was adopted by Emperor Heliogabalus and assumed the name by which he is known in history. His education was received at Rome, where he attained a wide popularity, and at the death of the emperor in 222 was proclaimed sovereign by the prætorians and confirmed by the senate. His reign was prosperous and peaceable until he declared war against the Persians in 231, the contest checking Persian advance, but not maturing to the material advantage of the Romans. The Germans invaded Gaul in 235, and he personally commanded the Roman army against them, but was slain in a mutiny by his own men.

ALEXANDER SEVERUS.

SEVERUS, Lucius Septimius, Roman emperor, born in the African town of Leptis Magna, April 11, 146; died Feb. 4, 211 A. D. His family was of the equestrian rank, and provided well for his early education. He afterward removed to Rome, where he was made prætor in 178. After commanding the army in Gaul, he became governor of Gallia, Pannonia, and other provinces, and in 193 was proclaimed emperor as successor to Pertinax. However, Didius Julianus had been placed on the imperial throne by the prætorians before Severus reached Rome, but he successively defeated him and other rivals, banished the prætorians, and won the support of Albinus, commander of the Roman forces in Britain, by conferring upon him the title of Cæsar. Shortly after he made an extended campaign in the East, which was followed by capturing Byzantium after a three years' siege. Clodius Albinus became ambitious a second time to occupy the throne of Rome, and accordingly organized a force of 150,000 men, but was defeated by Severus with great loss at Lyons in 197. The latter soon after returned to Rome, where he distributed much valuable property secured on his extensive campaigns, but subsequently made a second expedition to the East to repel an invasion of the Parthians and suppress insurrections in Seleucia and Babylonia. He crossed into Egypt from Parthia, where he captured Alexandria, and soon after returned to Rome with a large amount of wealth and gold, which he lavished upon his soldiers and subjects. A rebellion in Britain required him to lead an army across the English Channel in 208, and while on the island marched into Caledonia. To provide a defense against the Caledonians he built a wall from the Solway Firth to the Tyne River. He died at York three years after entering Britain.

SEVIGNE (sā-vēn-yā'), **Maria de**, eminent letter-writer, born in Paris, France, Feb. 6, 1626; died April 18, 1696. She was a daughter of the baron of Chantal, who lost his life in the war against England in 1627, and her mother died a few years later. She was trained under her maternal uncle, the abbé of Coulanges, who provided amply for her education, giving her the advantages of a liberal course in French, German, Italian, Spanish, and Latin. In 1644 she was married to the marquis of Sévigné, a Breton of good family but small estate, who was killed in a duel in 1651. She never married again, though many opportunities of considerable merit were presented, but instead devoted herself to the culture of her two children, a son and daughter. The daughter, Françoise Marguerite, became Madame Grignan in 1669, and accordingly accompanied her husband, Marquis Grignon, to Provence, where he held the rank of lieutenant-general. Thus the opportunity for the many letters written by Madame Sévigné was presented. These letters cover the principal events of European history for about twenty-five years. They are of value alike from the standpoint of history and the charming style in which they are written, and sparkle with remarkable affection, wit, frankness, and careful scrutiny of human character. A complete edition of these writings was not printed until 1726, thirty years after her death.

SEVILLE (sĕv'ĭl), a city in Spain, on the Guadalquivir River, capital of the Seville province, sixty miles northeast of Cadiz. It occupies an imposing site on the east bank of the river, and is surrounded by walls of Moorish construction, which contain sixty-six towers and may be entered by fifteen gates. Most of the streets are narrow, but in the newer parts considerable improvement has been made by widening them

materially and constructing modern forms of architecture. It is an important railroad junction, has substantial pavements in the newer parts, and modern municipal facilities have been introduced to some extent, particularly electric lighting, sewerage, and rapid transit. The chief manufactures are leather, cotton textiles, silk and woolen goods, pottery, tobacco products, machinery, hardware, soap, leather, and utensils. It is important as a port of entry, having a large interior and foreign trade and a moderately spacious harbor. Seville is rich in ancient forms of architecture, the most important being a Gothic cathedral, a handsome Moorish palace, and numerous churches, halls, and hospitals. Its bull-ring is a stone structure with a capacity for 15,000 spectators, and there is an aqueduct of 410 arches dating from Moorish occupation. Besides its public schools, it has a large number of convents and academies, several institutions of higher learning, and numerous parks and gardens. The cathedral contains the tombs of Ferdinand, the son of Columbus, and Ferdinand III. of Castile, besides a large number of excellent sculptures, carvings, and an organ with 5,400 pipes.

Seville is an ancient city, and was called Hispalis by the Romans. No city of Europe contains finer remains of Moorish art and architecture, and none has a more interesting history. In the later part of the Roman period it rose to great importance, and during Vandal and Goth occupation it served as the capital of southern Spain. It fell into Moorish possession in the 8th century, when it rose to a city of 400,000 people, and in 1026 was made the capital of the Moorish kingdom. Ferdinand III. of Castile conquered it in 1248, but it remained the capital of Spain until the reign of Charles V., when that distinction was transferred to Valladolid. The discovery of America gave it an immense trade with the colonies. At that time it rose to the height of its prosperity, but much of its importance was soon after lost by trade centering at Cadiz. The French under Marshal Soult captured the city in 1810 and inflicted much damage, and in 1843 it was forced to surrender to Espartero. Population, 146,190.

SEVRES (sāvr), a town in France, on the Seine River, six miles southwest of Paris. It is noteworthy because of its extensive manufacture of porcelain, being the seat of the large factory removed thence from Vincennes in 1756. Porcelain products of elegant design and beautiful painting are produced there, some of the products being classed among the most valuable in the world. The town was taken by the German army in 1870, when its beautiful porcelain museum was partially destroyed by the bombardment afterward conducted by the French. It was attacked by the troops of the Commune in 1871. Population, 7,050.

SEWALL (sū'ạl), **Arthur**, ship-builder and public man, born in Bath, Maine, Nov. 25, 1835; died there Sept. 5, 1900. After attending the public schools, he entered the ship-yards of his father at Bath, and in 1854 formed a partnership with a brother for constructing sailing vessels. The firm continued business until the death of the elder brother in 1879, when the institution passed to the ownership of Arthur Sewall and his sons. The Roanoke, which was the largest wooden ship constructed in the United States, was built at these yards, and at the same place was built the Dirigo, the first steel ship completed in America. Sewall was interested in the Bath Iron Works, served as president of the Bath National Bank, and was president of the Maine Central railroad in 1893-94. He was an active and influential member of the democratic party, and was the nominee of that party for vice-president in 1896, but failed of election.

SEWARD (sū'ạrd), **William Henry**, statesman, born in Florida, New York, May 16, 1801; died Oct. 10, 1872. In 1820 he graduated at Union College, and after taking a law course entered the practice at Auburn. He was elected to the state senate as a sympathizer with the anti-Masonic movement in 1830, and four years later was defeated for governor as the whig candidate, but was elected to that office in 1838 and in 1840. He entered the United States senate in 1849, where he at once attained to leadership as an orator and opponent of slavery, and as such opposed the admission of Texas as a slave-holding state. When the republican party was formed he was among its foremost orators, and in 1860 became a prominent candidate for president in the convention that nominated Lincoln, whom he gave his earnest and hearty support.

WILLIAM H. SEWARD.

President Lincoln appointed Seward secretary of state, and during his term of service, in 1861-69, the important events of the Civil War and of reconstruction took place. Among the notable questions was the Trent affair (November, 1861), and it was due to his wise counsel that war with England was averted. He took an efficient part in averting trouble with France at the time Maximilian was executed in Mexico. The purchase of Alaska from Russia, in 1867, is another important event in which he rendered distinguished services. Seward was severely stabbed by one of the conspirators implicated in the assassination of Lincoln on April 14, 1865, his assailant enter-

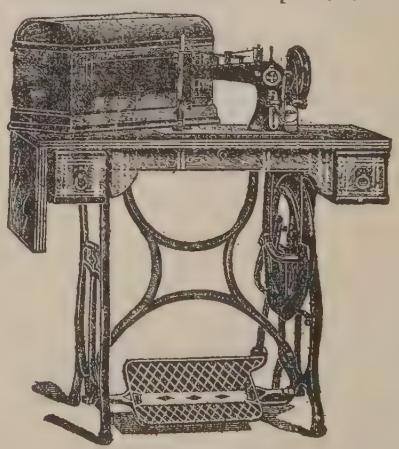
ing the bedroom in which he was confined on account of a broken jaw and arm, an injury received shortly before by being thrown from his carriage. He traveled extensively after retiring from office, and is the author of several works. Among his published works are "Life of John Quincy Adams;" "Speeches," and an "Autobiography." He delivered eulogiums in the senate on Webster, Clay, Clayton, Broderick, and Rusk.

SEWERAGE (sū'ĕr-āj), the method of collecting and removing refuse matter from dwellings and cities. The removal of waste materials and the disposal of them to the best advantage, or with the least possible liability of causing damage, are questions of vast importance. These problems may be solved only by studious investigation of the conditions existing in the locality affected, and the establishment of adequate sewerage systems involves the expenditure of large sums of money. The utility of supplying sanitary and drainage sewers in large towns and cities is apparent, since convenience and health depend upon removing the impurities. This is necessary in order to prevent them from contaminating the atmospheric air and the soil while in a state of decay.

Two general sewerage systems are constructed. In one class both the surface drainage and the sewage are carried in a combined system; while in the other a double system is provided, one for conveying the sewage proper, and the other for rain water and surface drainage. Formerly the combined system was used almost exclusively, and where it now exists additional districts are usually drained on the combined plan, since it is difficult to change from one to the other, but towns and cities putting in entirely new systems generally use the separate plan. The advantage arising from the newer mode of construction is that much larger conduits are necessary to convey rain water and surface drainage than are required for the sewage proper, and in many cases surface water can be carried into natural water courses by inexpensive artificial channels. Sewers vary in size from a small pipe to a tunnel large enough to be traversed in a boat, this depending altogether on the size of the district to be drained and the amount of fall that is afforded by the natural aspect of the region. The most common method of sewerage is simple flow by gravity to the nearest river or body of water, but sometimes the configuration of the surface makes pumping necessary to cause or aid the flow. Where such disposition is impracticable the sewage is sometimes filtered on a large scale or is chemically deodorized, or precipitated, the solid part being used in the preparation of fertilizers.

Many of the smaller towns and certain districts in the larger cities employ vitrified clay-pipe in constructing sewerage, but where a large quantity of matter must be disposed of tunnels are built of brick or stone. It is aimed to make the system proof against leakage, thus preventing a contamination of the soil, for which purpose sealing of asphaltum or some other material is applied. Sewer pipe is usually from eighteen to thirty-six inches in diameter, and it is possible to so construct a system with pipes of this kind that practically all leakage may be overcome and provisions made whereby it may be kept clean by flushing. In such a system there is the advantage that pipes have a greater carriage capacity for a given size than brick sewers, and they may be easily flushed from automatic flush tanks to prevent the formation of gases, by removing sewage before offensive decomposition has time to begin. In most American cities the sewerage systems are owned by the cities themselves, but there are some under the control of private companies, as in Galveston, Atlantic City, Phœnix, and about twenty others. In many instances the sewage is discharged into the open sea and carried away by the tides, in others it is discharged into rivers, and in some the sewage is conducted either through channels or carried by conveyance to special localities and utilized for fertilizing, as is the case in Berlin and other European cities. Private ownership of sewerage is not favored to any great extent, since it is thought that the public health may be better protected under public ownership.

SEWING MACHINE, a machine for sewing or stitching fabrics, leather, paper, and other materials. At present many

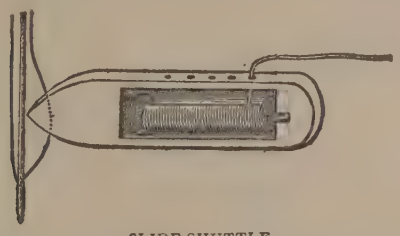


SEWING MACHINE.

kinds of these machines are sold in the market, all of them having an important use for one or more particular purposes, and serve useful functions in the manufacture of a large variety of products. Formerly all sewing was done by hand with needle and thread, and the first attempt to construct a machine to serve that purpose sought to imitate the hand movements in sewing. The

first invention of this class was made by a German named Charles F. Weisenthal in 1755, who made use of a double-pointed needle, with the eye in the center, and two pairs of pincers alternately seized the needle and passed it above and below the cloth. This principle was utilized later by Heilmann in constructing an embroidering machine that he exhibited in Paris in 1834. Little progress was made in sewing-machine construction until Elias Howe, of Cambridge, Mass., secured a patent, in 1841, for his lock-stitch machine. This stitch is now used in most machines, and the royalty received by Howe from manufacturers amounted to about $2,000,000.

Two threads are used in the lock-stitch, the one being pushed through the cloth by the needle to form a loop at the lower side; while the other is on a bobbin within a shuttle, and is carried through the loop, thus forming a stitch that is securely locked and cannot be undone by pulling. Some machines use a slide shuttle, as shown in the illustration, and others an oscillating shuttle, while still others employ a rotating hook that serves the same purpose. Previous to the invention of the lock-stitch, Isaac M. Singer invented a machine that made the chain-stitch, but this had the disadvantage that the whole seam became undone if one end of the thread was pulled. To overcome this defect he devised a plan to tie a knot in the seam at every eighth stitch by means of an ingenious mechanism. Allan B. Wilson is the inventor of the rotary hook and bobbin long used in the Wheeler and Wilson machine, and he also patented, in 1850, the four-motioned feed, that is used in nearly all machines. Since then innumerable improvements have been made, and machines are employed for purposes so varied that it is impossible to enumerate more than a few of the more important. These include the sewing of ordinary textiles and carpeting. They embrace machines for sewing buttonholes, stitching shoes, sewing gloves, making satchels and mail bags, and hemming the finest textiles. In the larger clothing factories and book establishments machines are operated largely by electric and steam power. Formerly machines for family use were turned by hand after being fastened to a table by set-screws, but now they are generally mounted on a table, as shown in the illustration, and worked by means of a treadle with the foot. Sewing machines of American manufacture are rated among the best, and are sold in all the countries of the world.



SLIDE SHUTTLE.

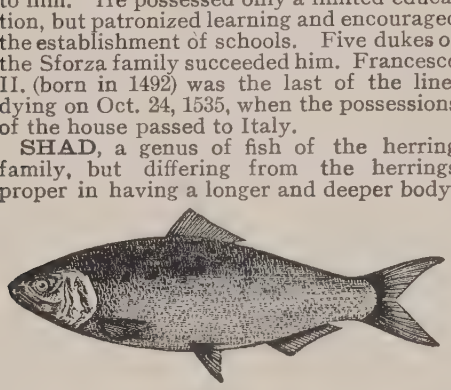
SEYMOUR (see'mur), a city in Jackson county, Indiana, sixty miles south of Indianapolis. It is an important railroad junction, has a large local and jobbing trade, and is surrounded by a fertile agricultural and dairying country. Electric lights, pavements, and waterworks are among the improvements. The manufactures include furniture, carriages, harness, ice, flour, woolen goods, and machinery. It is supplied with excellent public school buildings, has numerous churches, and is the seat of important railroad machine shops. Population, 1900, 6,445.

SEYMOUR, Horatio, statesman, born in Pompey Hill, New York, May 31, 1810; died Feb. 12, 1886. After studying at Hobart College, he entered Partridge's Military School, and later took a course in law. He was admitted to the bar in 1832, and in 1841 entered the New York legislature as a democrat. In 1843 and in 1844 he was elected mayor of Utica, and in 1852 became governor of the state, but was defeated for the same office two years later. He was again elected governor of New York in 1862, and as such was an efficient officer, but opposed the emancipation proclamation issued by President Lincoln. In 1864 he refused to be a candidate for president. However, he accepted the democratic nomination in 1868, but was defeated in the election by General Grant. At the election Seymour and Blair received 2,703,600 votes, against 3,013,188 votes cast for Grant and Colfax. He retired from public life soon after, but subsequently was president of the prison association of the United States.

SFORZA (sfort'sä), **Francesco,** eminent Italian military leader, born in 1401; died March 8, 1466. His father was the Count Alberigo de Barbiano (1369-1424), founder of the Italian family of Sforza, so called from the band of condottiere, a class of soldiers noted for their daring. The Sforza family played an important part in the affairs of Italy in the 15th and 16th centuries, not only influencing the government of northern Italy, but also a number of powerful European sovereigns. Francesco succeeded his father in the office of constable of the kingdom of Naples under Queen Joanna II. in 1424, and, as the custom permitted, fought under the sovereigns that gave the largest pay. Owing to skillful discipline and improvement in military tactics he became recognized as the leading military influence, and at various times fought for or against Venice, Florence, Milan, and the pope. His success brought him into high standing with the duke of Milan, whose daughter he married, and shortly after obtained Ancona and Pesaro from the pope. In 1450 he succeeded to the dukedom of Milan, and as duke

secured control of all Lombardy, besides a number of possessions south of the Po, while Louis XIV. ceded Genoa and Savona to him. He possessed only a limited education, but patronized learning and encouraged the establishment of schools. Five dukes of the Sforza family succeeded him. Francesco II. (born in 1492) was the last of the line, dying on Oct. 24, 1535, when the possessions of the house passed to Italy.

SHAD, a genus of fish of the herring family, but differing from the herrings proper in having a longer and deeper body,



SHAD.

and notches in the upper jaw. Writers have described a number of species that are more or less widely distributed, and all are esteemed for food. They inhabit the sea near the mouths of rivers, and ascend the current in the spring to spawn. The American shad is caught off the Atlantic coast from the Gulf of Mexico to Newfoundland, and has been successfully naturalized and planted in the Pacific. It attains a length of twenty inches and a weight of two to ten pounds. The best known species of Europe are the allice shad and the thwaite shad. The former attains a weight of about eight pounds, and has fine-flavored flesh; while the latter is smaller, weighing about two pounds, but its flesh is coarser than that of the allice. The shad is bred extensively by the United States fish commission.

SHADDOCK (shăd'dŭk), a tropical tree of the citrus or orange genus and sometimes called pompelmous. It is cultivated for its fruit. The fruit resembles the orange, having a pale-yellow color, and a juicy interior of a slightly acid taste. The shaddock is native to eastern Asia, whence it was brought to America by Captain Shaddock, from whom it was named. Many varieties have been obtained by propagation, several of which are cultivated in Florida, California, and the West Indies. The great fruit, or pomelo, bears a fruit about the size of a large orange, while the fruit of the pompelmous has a diameter of about eight inches.

SHADOW, the obscurity of light within an illuminated region, caused by intercepting the passage of light by an opaque body. The depth of a shadow depends upon the distance from the object upon which it is thrown, since the rays of light, by virtue of the properties of reflection, refraction, and dispersion,incline to bend around the opaque object; thus an increase of the distance between the object and its shadow proportionately increases this action. Shadows also depend upon the intensity of light, as contrast is decidedly more marked in a strong than in a dim light. It is not infrequent to apply the term shadow to an interference of any kind of radiation, as sound shadow and electric shadow. A sound shadow is produced by any object that prevents the free passage of sound waves, as the interposition of a wall between the source of the sound waves and the ear. Electric shadows are produced in the same way, but it must be borne in mind that interposed objects have a varying effect. For instance, glass forms no material obstruction to light, but interferes with the radiation of heat; while a stone or brick wall obstructs sound waves, but does not hinder the free passage of an electric current.

SHAG, the name frequently applied to several species of the cormorant. It has special reference to a variety known as the crested cormorant, which has a crest of feathers. See **Cormorant**.

SHAGREEN (shȧ-grēn'), a kind of leather or parchment prepared from the skins of horses, camels, and other animals. The skins are first cleared of the hair and scraped, after which they are stretched on a frame and covered with the seed of the goosefoot. After moistening and covering with a felt, pressure is applied to sink the seeds into the skins. Subsequently they are shaved down to the level of the depression thus made, and afterward the compressed parts are made to swell by soaking. Prepared in this way, the leather has a peculiar granular appearance, which is often imitated in a common style of bookbinding-cloth. It is frequently dyed red with cochineal or green with sal-ammoniac and copper filings. A kind of shagreen is made from the skins of various fishes covered with closely set papillæ, such as the sharks, rays, and others. These skins are prepared like parchment, and finished by dyeing and smoothing. This class is used in making cases for spectacles, watches, cigars, and edged instruments.

SHAH-JEHAN, the title assumed by Khorrum Shah, fifth Mogul emperor of Delhi. The date of his birth is uncertain, but it is known that he was employed in military expeditions against the Mohammedan states of the Deccan in the reign of his father, and that he entered a rebellion against his father in 1623. On the death of the latter, in 1627, he at once ascended the throne. It may be said the empire had reached its greatest security at the time of his accession, but his reign was in the main successful, though warlike. After conquering the Deccan kings, he annexed the kingdom of Ahmednuggur in 1631, subjected Beejapur and Golconda in 1636, waged a long contest against the Uzbeks of Balkh, and made two unsuccessful attempts to expel the Persians from Kandahar. His reign became celebrated because of his remarkable sagacity, and he is remembered

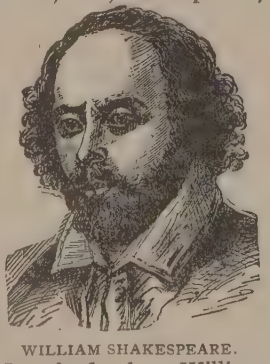
by many magnificent buildings that have been preserved to the present time. He is the founder of Delhi, where he caused the erection of the celebrated peacock throne costing about $34,500,000, built the pearl mosque and the Taj Mahal at Agra, and a number of other structures of great beauty. His son, Aurungzebe, deposed him in 1658, and his death occurred in December, 1666.

SHAHJEHANPORE (shä'jĕ-han-pōōr'), a city of India, in the Northwest Provinces, ninety-six miles west of Lucknow, with which it is connected by railroads. It is situated on an imposing site near the Gurrah River, contains a number of stately mosques and castles, though these are largely in ruin, and is the center of a large export trade. An American Methodist mission station is located there, by which a number of schools and churches are maintained. Large quantities of sugar, cereals, and live-stock are produced in the vicinity. The city was founded in 1647 by Shah-Jehan, in whose honor it was named. Population, 78,690.

SHAKERS (shāk'ĕrs), a communistic religious sect, whose official title is United Society of Believers in Christ's Second Appearing. It had its beginning in Manchester, England, where it was first advocated by Ann Lee. She married a blacksmith at an early age and had four children, who died in infancy, and it is perhaps due to this circumstance that she became an advocate of celibacy instead of the marriage state. Her first connection with ministerial work followed soon after coming in contact with Jane Wardlaw, the wife of a tailor, who professed to be a prophetess and that she had received a call to testify to and spread the truth. The Wardlaws were originally Quakers, but claiming a special revelation in regard to the second coming of Christ, they became estranged to some tenets of that faith and found an able advocate in Ann Lee. The chief doctrine preached by these people was that the end of all things was near at hand, and that Christ would appear in the form of a woman and reign upon the earth. The meetings held in various parts of England attracted such crowds that the Wardlaws and Ann Lee were imprisoned, and after being released the latter claimed to have received the important revelation that she had been accepted as the female of Christ. Hence she became recognized as the head of the Shakers and was called Mother Lee. She claimed to be the bride of the Lamb and that she was the queen mentioned by David in the Psalms, but these pretentions were met with ridicule. Subsequently she claimed to have received a revelation to the effect that America was to be the foundation of the coming kingdom, and that she and her followers should seek a home there. Accordingly she and seven disciples came to New York, and in 1774 made a settlement at Watervliet, near Albany. Subsequently many other settlements were made.

Among the chief tenets held at present by the Shakers is the dogma that the old law has been abolished and the new dispensation begun. They believe that the Holy Ghost makes immediate revelations to mankind; that the kingdom of God is now at hand and intercourse between earth and heaven has been restored; that man is freed from all errors except his own, and the sin of Adam is atoned; that heaven is in fact upon earth, and will be brightened into its primeval state by labor and love. They hold several tenets in common with the Quakers, and with them object to taking oaths, reject sacraments, and refrain from the complicated courtesies of society. Jesus Christ is regarded a divinely inspired man, representing the fatherhood of God, while Ann Lee was inspired to reveal to mankind the motherhood of God. Worship is conducted in churches, in which the worshipers step in uniform movements while singing hymns, and listen to discourses on doctrine and duty. Celibacy is observed strictly. The society is recruited mostly by young men and girls, but married persons may join, who on entering are enjoined to live as brother and sister. The Shakers are noted for their industry, the men engaging in gardening, farming, building, and various arts; while the women attend to the work of education and household duties. All property is held in common, and at prevent is valued at $10,000,000. The organization has sixteen churches and a membership of 1,650 persons. The members are divided into about thirty families, ranging from five to one hundred persons in each, but the Mount Lebanon, New York, society is by far the most important. Most of the communities are in the New England states, but there are families of Shakers in Ohio, New York, Georgia, and Kentucky.

SHAKESPEARE, William, eminent poet and dramatist, born in Stratford-on-Avon, England, April 26, 1564; died April 23, 1616. Though the most famous writer in English literature, his authentic biography is very brief. His parents, John Shakespeare and Mary Arden, daughter of Robert Arden of Wilmecote, had eight children, four sons and four daughters, of whom he was the third child. His father was high bailiff of Stratford, where William probably attended the grammar school, but his early education was necessarily limited, for the reason that his parents had little education and his father was obliged to take him out of school because of having failed



WILLIAM SHAKESPEARE.

financially. He was soon after apprenticed to a butcher, and worked as a lawyer's clerk a short time, and in 1582 married Anna Hathaway, the daughter of a yeoman in the town of Shottery, near Stratford. Shakespeare was then only eighteen years of age and his wife was eight years older, this fact being ascertained from the date on her tombstone. Three children were born to this union, a son and two daughters. Susanna was born in 1583. They had twins in 1585, the son being named Hamnet and the other daughter Judith. The son died in his thirteenth year, and the two daughters outlived their father.

Little is known of the early married life of Shakespeare and no definite reason has been assigned why he abruptly left Stratford in 1586 to take up his residence in London, but there is a legend that he and several young companions had at one time robbed the deer park of Sir Thomas Lucy of Charlecote. For this he was seized, brought before the esquire and punished, and in retaliation he wrote a satirical ballad and attached it to a gate of Charlecote. Matters were made decidedly worse by this conduct, and Shakespeare sought refuge in London, where he earned his livelihood by holding horses at the doors of theaters, but his wit attracted the notice of actors and led to his employment as a player and dramatist. However, it is more probable that he developed considerable skill as a writer and formed the acquaintance of players from London who visited Stratford, and was induced by them and by the necessity to provide for the support of his family to seek his fortune in the city. He rose rapidly as a favorite member of the dramatic company, which was the most respectable and the most prosperous of that time. The most authentic account of his early success is secured from the attacks of disappointed rivals, the most noted being a pamphlet written by Robert Greene in 1592, and soon after published by Henry Chettle. In this he was accused of weakness and plagiarism, but it provoked such criticism that Chettle made an apology for publishing it, using these words: "I am as sorry as if the originall fault beene my fault, because myself have seene his demeanor no less civill than his exclent in the quality he professes: besides, divers of worship have reported his uprightnes of dealing which argues his honesty, and his felicitous grace in writing that approves his art."

Shakespeare is much more eminent as a playwright than as an actor, though he played successfully before the nobles and Queen Elizabeth, complimenting the latter in his "Midsummer Night's Dream." His first poetic production was published in 1593, entitled "Venus and Adonis," which he dedicated to Henry Wriothesly, earl of Southampton, whom he called "the first heir of my invention." The following year he published the "Rape of Lucrece," and from that time his fame and fortune were assured. He soon became a shareholder in the theater, bought a substantial house for $300 in 1597, and in 1602 purchased 107 acres of arable land at Stratford for $1,600. The acquisition of this and other valuable property brought him the style and title of William Shakespeare, Gentleman of Stratford-on-Avon, but it is certain that he did not leave the stage of London until after 1603, for in that year he occupied a place in the list of actors in Ben Jonson's play, entitled "Sejanus." He was a man of fine form and features, and enjoyed the intimate friendship of many eminent men of letters and high rank, among them Queen Elizabeth, James I., and Ben Jonson. His writings show a remarkable acquaintance with nature and human character, and have had a wide influence upon the English language. He stands as a central sun among the authors of England, and his writings have been translated freely into many languages.

The writings of Shakespeare may be divided into three classes, historical, semi-historical, and fictitious. His historical productions include "Henry VI.;" "Richard II.;" "Richard III.;" "King John;" "Henry IV.;" "Henry V.," and "Henry VIII." The semi-historical embrace "Titus Andronicus;" "Hamlet;" "King Lear;" "Macbeth;" "Julius Cæsar;" "Anthony and Cleopatra;" "Coriolanus," and "Cymbeline." Among his fictitious writings are "Love's Labor's Lost;" "Comedy of Errors:" "Two Gentlemen of Verona;" "A Midsummer Night's Dream;" "Merchant of Venice;" "Romeo and Juliet;" "Much Ado About Nothing;" "Twelfth-night;" "As You Like It;" "Taming of the Shrew;" "Pericles;" "Merry Wives of Windsor;" "Measure for Measure;" "All's Well that Ends Well;" "Timon of Athens;" "Troilus and Cressida;" "Othello;" "Winter's Tale," and "The Tempest."

SHALE, a class of rock. They are so named from their tendency to scale into thin sheets. These rocks were formed from sediments deposited by waters and afterward hardened, and are found in any age depositing silt that has not been disturbed by metamorphic action. There is a wide range in color and composition. Among the chief kinds are the calcareous, sandy, carbonaceous, and bituminous. The last mentioned yields naphtha, alum, paraffin, and other oils of importance commercially. Many finely preserved fossil remains are found in shales, especially those occurring with coal deposits.

SHAMOKIN (shą-mō'kĭn), a borough of eastern Pennsylvania, in Northumberland county, about twelve miles south of Danville. The surrounding country produces cereals, fruits, and anthracite coal. It has good railroad facilities, several school and church buildings, and a public library. Waterworks, electric railways, and telephones are among the improvements.

Among the manufactures are powder, earthenware, machinery, cigars, and dairy products. Population, 1900, 18,202.

SHAMROCK (shăm'rŏk), a plant bearing three leaflets, and held memorable as the national emblem of Ireland. Some think it is the wood-sorrel, but the white clover is the one more generally used. It is said that St. Patrick selected a trefoil plant, that is, one having a three-parted leaf, to illustrate the doctrine of the trinity, hence the shamrock was made the national emblem. The plant commonly sold in Dublin on St. Patrick's Day, March 17, is the yellow trefoil. A green-colored imitation is sold on that festival in many cities of the United States.

SHAMYL (shăm'ĭl), **Samuel**, military leader of the Caucasus tribes, born at Aul-Himry, in the Russian government of Daghestan, about 1797; died in Medina, Arabia, in March, 1871. After studying Arabian grammar and philosophy under the Mollah Jelal-eddin, he became a leader of a Mohammedan sect, and united a large Caucasian force against the Russians. The tribes of Daghestan soon recognized him as imam or chief, and by skillful organization he succeeded in defeating a Russian army in 1837. His forces were defeated at the fortress of Akulgo, and it was thought that he was among the slain, but he soon after reorganized and continued a formidable opponent to the Russians until 1859, when he was surprised and captured on the plateau of Ghunib, where he had built a fort. The Russians carried him to St. Petersburg, where he was treated kindly by the czar, who assigned him a residence at Kaluga and an annual pension of $5,000. In 1870 he went on a pilgrimage to Mecca as a parole prisoner, but died the following year.

SHANGHAI (shăng-hä'ĭ), the most important seaport city of China, on the Hwangpoo River, twelve miles from the mouth of the Yangtse-kiang. The city is divided into two parts, the Chinese city proper and the portion occupied by foreigners. Walls twenty-four feet high enclose the Chinese part of the city, which are entered by six gates. Many of the streets are quite narrow and dirty, while the architecture is generally of an inferior kind. The part of the city occupied by foreigners lies north of the Chinese walls. It is well paved, is lighted by gas and electricity, and has numerous other modern facilities, including rapid transit. Many nationalities are represented in the part occupied by foreigners, but the majority are Italians, Americans, Germans, English, and French, and the government of this portion of the city is distinct from that of the Chinese part. In it are a number of excellent buildings, among them a fine cathedral, consular and municipal offices, hospitals, churches, and several educational institutions. The city has manufactures of clothing, wearing apparel, sailing vessels, earthenware, utensils, fans, and textiles. Its harbor is safe and commodious, having many extensive quay improvements and dry-docks. It has an immense interior and foreign trade in rice, silk, tea, cotton, hemp, wheat, paper, sugar, chemicals, fruit, oils, tobacco products, wool, metals, and opium. A large share of the export trade is transacted with America, Japan, Germany, Britain, France, and Russia. The total annual value of the export and import trade is about $275,000,000. Shanghai dates from remote antiquity, but its importance as a trade center began in 1843, when it was opened as one of the five treaty ports and foreign settlements and trade became established. Population, 460,000.

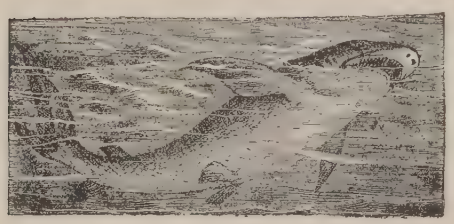
SHANNON (shăn'ŏn), the largest river in Ireland, which rises at the western base of the Cuilcagh Mountains, and after a southwesterly course of 250 miles enters the Atlantic Ocean. It flows through a number of loughs or lakes, among them Allen, Doburg, Bofin, Ree, and Derg, and from Limerick it forms a broad estuary seventy miles in length. The Shannon is navigable for large vessels to Limerick, and for small craft as far as Athlone. It is connected with Dublin by two canals. Among its affluents are the Suck, Foyle, Fergus, and Brosna.

SHANS, or **Laos**, a group of native tribes occupying a region of Asia that lies between China, Siam, and Burmah, and who maintain a semi-independent form of government. The Shans and Laos are closely related to the Siamese, and so resemble each other that little distinction is usually made between them. They are early descendants from the Chinese, their ancestors having settled in the valley of the Irrawaddy about the 6th century. The region occupied by them is formed of numerous fertile valleys containing valuable forests, while the intervening ridges are noted for their deposits of petroleum, copper, coal, gold, silver, and other minerals. Their country embraces a number of states, which are governed by a chief and a council, the northern states being tributary to Burmah and the southern to Siam, but there is a considerable Shan population in the adjoining region of China. The people are skilled as manufacturers of jewelry, metal-ware, carpets, and various textiles. They carry on a considerable trade in these products, timber, and live-stock. The Shans are quite industrious, giving marked attention to the cultivation of rice, sweet potatoes, the poppy, maize, melons, pepper, and fruits. They are adherents to the Buddhist faith. Serfdom is an extensive institution, and slavery of a mild form exists in some of the states. Xieng Mai is the principal city and the chief center of political influence. The Shan population included in Siam is estimated at 1,500,000, and there are probably an equal number included in China and Burmah.

SHARI, a river of Central Africa, the

most important flowing into Lake Tchad. It rises north of the Congo Free State by several branches, and after a course of 700 miles toward the northwest enters the lake by several mouths. The Shari flows through a region containing fine forests. In its vicinity are many wild animals, such as birds and hippopotami.

SHARK, an extensive genus of fishes of the ray family, found widely distributed in the ocean, but most abundantly within the



MAN-EATING SHARK.

tropics. The body is elongated in most species, the tail thick and fleshy, and the teeth are generally large, sharp, and formed for cutting. The skin is scaleless, but usually very rough with thorn-like tubercles, and is used in making shagreen. They swim with great rapidity at long distances, often pursuing ships for the sake of securing the offal and waste materials thrown overboard. Some deep-sea species attain an enormous size, and are noted for their voracity in devouring other forms of sea life. All species are more or less destructive of food-fishes and do immense damage to the fisheries. The most powerful of the man-eating sharks is the white shark or man-eater of the warm seas. It is found in the waters off the southerly coasts of the United States, where it attains a length of forty feet. It scents food for some distance, and is readily attracted by blood or decomposing bodies. Other large species of sharks are the tiger shark, the blue shark, and the common dusky shark. The flesh of some varieties is eaten, the liver yields an oil, and the hide is serviceable in polishing fine-grained wood and in covering the hilts of swords to make the grasp firmer.

SHARON (shâr'ǫn), a town of Pennsylvania, in Mercer county, on the Shenango River, seventy-five miles northwest of Pittsburg. It has good railroad facilities, and is extensively engaged in coal mining and iron manufacturing. Among the products of the factories are flour, boilers, nails, lumber products, furnaces, and machinery. The town is supplied with good public schools, churches, and numerous municipal facilities. Population, 1900, 8,916.

SHAW, Henry Wheeler, humorist, best known as Josh Billings, born in Lanesboro, Mass., April 21, 1818; died in Monterey, California, Oct. 4, 1895. His father, Henry Shaw, was a member of congress in 1818-21, and after giving him the advantages of a common school education, he provided for his entrance into Hamilton College in 1832. The son soon left college to become a deck-hand on an Ohio River steamboat, and afterward engaged in farming and as an auctioneer. He settled in Poughkeepsie, New York, in 1858, and the following year published his popular "Essay on the Mule" over the nom-de-plume Josh Billings. Soon after he went upon the platform as a lecturer, delivering his addresses in an awkward, backwoods dialect, which he also utilized in his writings. Among his published works are "Josh Billings' Farmers' Allmanax;" "Josh Billings on Ice;" "Josh Billings' Spicebox;" "Josh Billings, His Sayings," and "Josh Billings' Complete Works."

SHAWL, a garment or wrap worn as an outside covering of the person, and generally used by ladies, but in some countries also by men, as among the Scotch highlanders. Garments of this class have been used as apparel from remote antiquity, but they were not generally introduced until about the middle of the 16th century, when the celebrated cashmere shawls became an important article of commerce. They are usually made of a square of cloth or as a large, broad scarf, and the materials used include wool, cotton, silk, hair, lace, or a mixture of fibers. Cashmere shawls made of the under wool of the cashmere goat of Thibet were the first worn in Europe, and their designs have been imitated in woven shawls. The cashmere shawls made in Thibet and India are often valued as high as $1,500, the price being high because of the fine material used and the work being done with the greatest care by hand, some requiring six months or more for completion. At present there are extensive manufactories producing shawls in the United States, particularly at Lowell, Mass., and other cities of the eastern and middle states. They are an important product in many countries of Europe.

SHAWNEE, a city of Oklahoma, in Pottawatomie county, about thirty-five miles southeast of Oklahoma City. It has railroad facilities, telephones, waterworks, and electric lights. The surrounding country is fertile, producing cereals, grasses, and fruits. It is the seat of several fine schools and churches, and has a growing trade in live-stock, grain, and merchandise. Population, 1900, 3,462.

SHAWNEES (sha'nēz), an Indian tribe of North America, belonging to the Algonquin family. They were driven westward from New York by the Iroquois, but joined the French against the English, and later aided Pontiac until the peace of 1786. Subsequently they took part in the Miami War, but were reduced by General Wayne and concluded peace in 1795. In 1812 a part of the tribe joined the English, but later they

moved to Missouri and finally to Kansas, whence a number entered Indian Territory in 1854.

SHAYS (shāz), **Daniel**, leader of Shays' Rebellion, born in Hopkinton, Mass., in 1747; died in Sparta, New York, Sept. 29, 1825. He entered the continental army at the beginning of the Revolutionary War and attained to the rank of captain. After independence was secured, he became the leader of a party in Massachusetts that demanded redress from high taxes and public expenditures. In 1786 he was chosen to lead 1,000 insurgents, who appeared at Springfield to prevent the session of the supreme court, and the following year made an attempt to capture the continental arsenal. The state in the meantime raised a militia of 4,000 men under Gen. Benjamin Lincoln, which attacked Shays near Springfield on Jan. 25, 1787, and quickly routed his forces. Three insurgents were killed and one wounded, while the main body fled to Amherst, where 150 were captured and the rest dispersed. A number were sentenced to be hanged, but later a general pardon was granted, and Shays received a pension in his old age for services rendered in the Revolution.

SHEARWATER (shēr'wą-tẽr), a genus of web-footed birds of the petrel family, found widely distributed over the seas. They are about the size of a pigeon, have a brownish color above and white beneath, and are usually seen at no great distance from land, to which they resort only in the breeding season. A single white egg is laid in a hole under ground, and the young are clothed with thick, long down. Among the different species are the sooty shearwater of the North Atlantic, the great shearwater of Greenland and Iceland, the manx shearwater of western Europe, and the dusky shearwater native to the West Indies. The young are usually fat and considered a favorite food. The great shearwater is about twenty inches long and has an alar extent of forty-five inches. It associates with the fulmars, and in walking has the shambling movement of the duck.

SHEBOYGAN (shẹ-boi'gąn), a city of Wisconsin, in Sheboygan county, fifty miles north of Milwaukee. It occupies a fine site on Lake Michigan, near the mouth of the Sheboygan River, and has ample railroad and steamboat facilities. Its harbor is safe and commodious, and there are important manufactures of furniture, leather, flour, earthenware, lumber products, machinery, wagons, and shoes. It enjoys a large wholesale trade in manufactures, lumber, fish, and agricultural products. Besides its excellent public schools, there are Lutheran and Roman Catholic parochial schools, a number of charitable institutions, and numerous fine churches. It is supplied with gas and electric lights, street railways, several public parks, and other facilities. It is the county seat and contains a fine courthouse and other county buildings. The surrounding country is fertile, yielding cereals, grasses, and vegetables. Population, 1900, 22,962.

SHEEP, an important and useful class of ruminant animals, which are closely allied to the goat, but differ from it in having

MERINO RAM.

somewhat twisted horns with transverse ridges. The horns are hollow, and sometimes they are wanting in the females. They are destitute of a beard and the strong odor in the male goats. Few animals possess greater value to man than do sheep, since their flesh is a nutritious food; the skin is useful for leather, parchment, and robes; the wool is of value in making staple clothing, and the milk is used for making butter and cheese in some countries. The flesh of the young is lamb, of the adult, mutton. The male sheep is called a ram, the female is designated a ewe, the young is termed a lamb, and a company is called a flock. Sheep have been domesticated from remote antiquity, Abel being mentioned in Genesis as a keeper of flocks of sheep. It is impossible to ascertain whence the domestic stock came, since they were introduced into western Europe before the historic period, but it is thought that their nativity is in the mountain regions of Asia. Wild sheep are essentially mountain animals, several species being still found in many sections of Central Asia and various parts of Africa, but animals of the wild stock are much smaller and have greatly inferior wools to the native and cultivated varieties. They are gregarious both in the wild and domesticated state, and the ram is noted for its strong forehead, with which it is able to butt with considerable force against a foe.

Sheep culture was first introduced into America in 1609, and rapidly developed as an extensive industry, largely for the reason that sheep may be kept profitably on rough lands of little service except for pasturage, and because they are able to endure extremes of temperature. The ewe frequently brings forth twins, but usually only one at a birth, and the lambing season occurs generally in early spring. About 90 per cent. of the sheep reared in the United States are Merinos, this grade being noted for its silky and

fine wool, and was first introduced from Spain in 1801. Other grades of sheep include the Southdown, Shropshire, Cheviot, Delaine, Dorset horn, Leicester, Hampshire down, Lincoln, Cotswold, Rambouillet, Silesian, and Saxon. The broad-tail sheep of Asia is remarkable for its large tail, which often weighs from seventy to eighty pounds and is considered a great delicacy for food. It is protected by the shepherd, who attaches to it a small board on rough wheels to prevent it from being injured by dragging on the ground. The Wallachian sheep is noted for the size of its horns, and the Iceland sheep for having from three to five horns. Among the most valuable are the Astrachan and Circassian sheep, which yield the famous Astrachan wool. The most extensive development of the sheep industry in the United States is in the arid regions of the west, but there are large interests in sheep rearing in New York, Ohio, Pennsylvania, and other central states. Australia, Central Asia, and various parts of Europe are among the principal sheep growing regions of foreign countries. See Wool.

CHEVIOT EWE.

SHEEPSHEAD, a spiny-rayed food fish common to the Atlantic coast of the United States. It is so named from the shape and color of its head, is highly esteemed for the table, and is caught by nets. Its size is from twenty to thirty inches, and the weight from eight to ten pounds. The food of the sheepshead consists of shellfish and crustaceans, which it crushes with its teeth. Among the allied species are the butterfish, moonfish, and the fresh-water drum. The moonfish has a light-gray color, a short and thick body, and is about twenty inches long. It is caught chiefly in nets, since it is skilled in biting off the line with its sharp incisors.

SHEEP-TICK, an insect belonging to the family of horse-flies, and often troublesome to sheep. It is wingless, has a flattened body, long proboscis and broad head, and is parasitic on the body of sheep. The female attaches its eggs to the wool of the sheep, from which the young develop in a short time. They soon begin to extract blood by fixing the head in the skin of the sheep, often forming a large tumor. These pests are destroyed by dipping the sheep into various poisonous solutions. Sheep louse is another name for the same insect.

SHEFFIELD (shĕf'fēld), an extensive manufacturing and commercial city of England, in Yorkshire, at the confluence of the Don and Sheaf rivers, 145 miles north of London. It is important as a railroad junction, has regularly platted and well improved streets, and occupies an imposing site. Sheffield has excellent canal connections; the Don River was made navigable as early as 1751. Among its notable buildings is the church of St. Peter, dating from the reign of Henry I., St. Mary's Church, St. George's Museum, Wesley College, Firth College, Ranmoor College, and the Church of England Educational Institute. The city is beautified by many fine monuments, statues, and gardens. It is provided with a large number of public schools, numerous hospitals and charitable institutions, and many institutes devoted to arts, sciences, and secondary learning. Among the manufactures are cotton textiles, woolen and silk goods, vehicles, buttons, hardware, cutlery, armor plate, railroad supplies, and engines. Its most noted manufactured products are different forms of cutlery, these having existed in the city since 1620, when Cutler's Company was organized. The city was founded by the Saxons, but its site had been used as a Roman station for many years. Edward I. granted a charter in 1296. Chaucer mentions the town as an important center for the manufacture of cutlery. Mary Queen of Scots was imprisoned for fourteen years in the castle maintained in the time of Queen Elizabeth, when the castle was known as the Sheffield Manor-house. However, its importance as a trade and manufacturing center dates only from the early part of the last century, being greatly augmented by the building of railroad and other improvements. It is finely improved by electric lights, street railways, waterworks, telephones, and public parks. Population, 347,242.

SHELBY, Isaac, pioneer and soldier, born in North Mountain, Maryland, Dec. 11, 1794; died July 18, 1826. His father engaged in the cattle business in Tennessee, where his family removed soon after, and Isaac engaged in the border Indian war. He entered the colonial army at the beginning of the Revolution, and distinguished himself at the battle of Long Island Flats, Tennessee, with the Indians in 1776. Subsequently he assisted in capturing the British stores at Chickamauga, took part in the battle of King's Mountain, and served as governor of Kentucky in 1792-96 and again in 1812-16. In the War of 1812 he organized a body of 4,000 volunteers and joined General Harrison in Canada, taking part in the victory of the Thames. Congress voted him a gold medal for this service.

SHELBYVILLE (shĕl'bĭ-vĭl), a city in Indiana, county seat of Shelby county, on the Big Blue River, twenty-five miles southeast of Indianapolis. It has good railroad conveniences, is surrounded by a fertile farming and dairying country, and has a large trade in cereals, live-stock, and merchandise. Among the manufactures are flour, ice, carriages, tobacco products, bicycles, machinery, and furniture. Natural gas is obtained in its vicinity. The city is improved by electric lights, pavements, waterworks, a fine courthouse, and several public school buildings. Population, 1900, 7,169.

SHELDON, Charles M., author and clergyman, born in Wellsville, New York, in 1858. His early life was spent on a farm in Dakota, and he afterward studied at Brown University and Andover Theological Seminary. He went to London in 1886 to study the conditions of the poorer classes, and two years later became pastor of the Central Congregational Church at Topeka, Kansas. His books have had a very large sale, especially the one entitled "In His Steps," which was written from the view of the question, "What would Jesus do?" It has been translated into German, Spanish, French, Swedish, Norwegian, Russian, Italian, Armenian, and many other languages. Other publications include "Richard Brice;" "Twentieth Door;" "King's Question Book;" "Crucifixion of Philip Strong;" "His Brother's Keeper;" "Malcolm Kirk;" "Redemption of Freetown," and "For Christ and the Church."

SHELDRAKE (shĕl'drāk), the common name of a class of ducks, usually regarded a connecting link between geese and ducks.

SHELDRAKE.

They are native to Eurasia, Australia, and Africa. The head and neck are dark glossy-green with a white collar beneath, and under this is a chestnut color that extends over the upper part of the back. The rest of the plumage is white with black and greenish markings. They frequent sandy coasts, breeding in a burrow, often that of the rabbit. They lay about twelve or fourteen eggs, which are nutritious food. The sexes are quite alike in plumage, but the male is somewhat the larger. These ducks, though quite shy, are capable of being domesticated. Large numbers are hunted for their eggs and down in the Black, Caspian, Mediterranean, and other seas. Besides the common sheldrake, there are the ruddy sheldrake of Barbary and the chestnut sheldrake of Australia. An allied species common to the United States is sometimes called sheldrake, but it is more properly a red merganser.

SHELL, the hard covering of many invertebrate animals. It serves to encase the soft and vulnerable bodies of certain invertebrates, but the term is also applied to the covering of some part of it, and to the outer envelope of an egg. Many different classes of shells occur in the animal kingdom, varying in size from minute microscopic organisms to large formations weighing 500 pounds. All shells possess a more or less distinct organic structure, which in some animals resembles true skin, while in others it is quite like the epidermis of the higher animals. The shells of many groups of mollusks differ so materially that it is often possible to determine the family, and in some cases even the species, from which small fragments of shell have been taken, this being true both in fossil and recent specimens. Their composition consists usually of calcium carbonate and albumen, and the shell formation gradually thickens by the addition of successive layers as the animal grows from infancy to maturity. Shells are known as porcelain or pearly, according to their constituency. Those having more lime than albumen form the hard porcelain shells, while those having consecutive layers of albumen and lime constitute pearly shells, so called from their resemblance to mother of pearl. The two classes as to form include the univalve and bivalve shells. Univalves are those having only one part, such as the shells of snails; and bivalves are those formed of two parts joined together by a hinge, like those of the clam and oyster. There are many different forms of both classes, but bivalves are largely pearly shells and univalves mostly porcelain. Shells are useful for many different purposes, among them for ornaments, buttons, and handles for edged tools. In some countries they are burned into lime and used for fertilizing land.

SHELL, a hollow metallic projectile filled with an explosive, which is fired either by a time fuse or by percussion. Shells were first invented in 1480, when they were made largely of cast iron and fired as bombs from mortars, and as such were successfully employed by the Turks at the siege of Rhodes in 1522. They came into general use by the middle of the 17th century, but since then many new and useful improvements have been made. Those of cast iron, intended for mortars and smoothbore cannon, are spherical in form, but elongated and cylindrical shells are generally used in rifled guns. When fired from a rifled gun, they take a rotary motion from the grooves, thus insuring truer carriage. The common shell is a hollow projectile charged with powder and used to destroy masonry and earthworks, but Shrapnel shells, so named for the inventor, contain bullets and fragments of iron in addition to a charge, and when set on fire release the contents with great destruction. Various modifications of these

two classes are made, such as segment shells, containing iron segments and powder; and carcases, containing material designed to set on fire the buildings or objects against which they are thrown.

SHELLEY (shĕl'ĭ), **Percy Bysshe**, noted poet, born in Sussex, England, Aug. 4, 1792; died July 8, 1822. He was the eldest son of Sir Thomas Shelley, a man of wealthy and ancient parentage, and studied at Eton and Oxford University. His first attempt at writing was undertaken at Eton, where he joined a fellow student in writing two romances, but soon left that institution because he fancied the government savored of tyranny. At Oxford he experienced like unpleasantness and as a consequence filled his mind with atheistic arguments. In 1811 he published a tract entitled "Necessity of Atheism," for which he was expelled from the university, and shortly after married Harriet Westbrook, a girl of inferior rank, which caused his family to renounce him. This union proved unhappy. His wife with two children returned to her father's house in 1814, and two years later ended her sad life by drowning. He had previous to this made an extended tour through France, Germany, and Switzerland in company with Mary Godwin and a relative, Miss Clairmont, and shortly after the death of his wife married the former. The delicate state of his health rendered it necessary that he should leave England for a warmer climate, and the remainder of his life was spent abroad, with only one short interruption.

PERCY B. SHELLEY.

While in Switzerland Shelley formed the acquaintance of Byron, upon whom he exerted a powerful influence, and ever after kept up an intimate acquaintance with him. Shortly after he settled at Rome, where many of his finest productions were composed. Boating had always been a passion with him, and it was especially convenient to take trips to Naples, Florence, Pisa, and other points of interest. His friends included besides Byron, Leigh Hunt, Trelawney, and a number of other eminent writers. His death resulted while returning with a friend from Leghorn in a small yacht, which was caught in a wind and stranded in the Gulf of Spezia and both were drowned. His body was washed ashore, and according to the quarantine laws of Tuscany was burned. The ashes were deposited in the Protestant cemetery at Rome by Byron. Shelley was gifted with genius of a high order, possessed richness and fertility of imagination, and was energetic in the reproduction of his conceptions. No English poet has surpassed him in the command of all the resources of metrical harmony. His early literary life was somewhat clouded by financial straits, but the death of his grandfather gave him a fixed income and a fine estate near Windsor Forest. His numerous writings include "Queen Mab;" "Alastor, or the Spirit of Solitude;" "Revolt of Islam;" "Witch of Atlas;" "Prometheus Bound;" "Rosalind and Helen;" "Sensitive Plant;" "Ode to a Lark;" "The Skylark;" "The Cenci," and "Hellas."

SHELL-LAC. See **Lac.**

SHENANDOAH (shĕn'ăn-dō-a), a city of Pennsylvania, in Schuylkill county, 138 miles northwest of Philadelphia. It has good railroad conveniences, and is an important market for coal and manufactures. The anthracite coal region in its vicinity produces annually about 1,500,000 tons. Among its manufactures are machinery, utensils, spirituous liquors, hats and caps, hardware, and vehicles. The city is supplied with gas and electric lights, electric street railways, substantial pavements, and excellent school and church facilities. Population, 1900, 20,321.

SHENANDOAH, a river of Virginia, which rises by two branches in Augusta county, and flows toward the northeast, joining the Potomac at Harper's Ferry. The Shenandoah valley lies between the Blue Ridge and the Alleghanies, and is one of the richest sections of the state. The river has a total length of 170 miles, and is navigable for a hundred miles from its mouth. Many notable events occurred in the valley of the Shenandoah during the Civil War. General Sheridan devastated it in 1864.

SHEPHERD'S PURSE, a widely distributed weed of the temperate zones, where it prevails in abundance along roadsides and in fields and pastures. The plant is an annual, has simple leaves, small white flowers, and bears its seed in a pod resembling a purse, hence its name.

SHERBROOKE (shĕr'brŏŏk), a city of Quebec, eighty miles east of Montreal, at the confluence of the Magog and St. Francis rivers. It is provided with several important railroad lines, and has manufactures of woolen goods, flour, cigars, hardware, clothing, and lumber products. In its vicinity are iron, asbestos, copper, and chrome deposits, and extensive lumber-producing forests. It is supplied with gas and electric lights, rapid transit, and has good school and church advantages. Population, 12,125.

SHERIDAN, Philip Henry, eminent military leader, born in Albany, New York, March 6, 1831; died at Nonquitt, Mass., Aug. 5, 1888. His parents came from Ireland and settled in Albany a short time before his birth, but soon after removed to Ohio, where he attended the public schools. He gradu-

ated from the West Point Military Academy in 1853. Subsequently he did military duty in various portions of the country, and entered the Union army in 1861 with the rank of captain. After serving as quartermaster of the army of southwestern Missouri and chief quartermaster of Halleck's army in Mississippi, he was promoted colonel of the Second Michigan cavalry in 1862. He defeated a superior cavalry force at Booneville and soon after was made general of volunteers. In the same year he displayed remarkable ability in rallying the Union forces at Perryville. On Jan. 2 and 3, 1863, he commanded the left division of the right wing of the Union army at Stone River, his efficient services in outflanking General Bragg being rewarded by promotion to the rank of major-general. He next fought at Chickamauga and Missionary Ridge. At the latter engagement he attracted the attention of General Grant by his combination of dash and judgment, and the latter soon after gave him command of the cavalry of the army of the Potomac. In that capacity he distinguished himself in the battle of the Wilderness on May 5-6, 1864, gaining by his continued success an appointment to the command of the army of the Shenandoah. Later he was assigned the task of clearing the northwestern part of Virginia, from which the Confederate forces continually threatened Washington. General Early had command of the Confederate forces at Winchester, where he was defeated by Sheridan in September, and shortly after at Fisher's Hill, the latter taking about 5,000 prisoners in the two battles.

PHILIP H. SHERIDAN.

On Oct. 19, 1864, the Confederates surprised and routed Sheridan's army at Cedar Creek. At that time Sheridan was on his way back from Washington, and hearing the noise of battle twenty miles away, at Winchester, he rode hastily to the contest and turned defeat into victory by waving his hat and shouting: "Face the other way, boys; we are going back." He was soon after made major-general in the regular army, and congress voted him the thanks of the nation. In 1865 he joined General Grant, and subsequently accompanied the army of the Potomac until the close of the war, assisting in the operations before Petersburg and the final surrender of General Lee at Appomattox. He commanded the department of the gulf in 1866-67 and of the Missouri in 1867-68, and was made lieutenant-general in 1869, and general in 1888. In 1870 he witnessed the leading battles and maneuvers of the Franco-German War. He was modest, and could be relied upon to manage efficiently important commands, while his boldness, dash, foresight, and judgment were alike admirable. Grant compared him with Napoleon and Frederick the Great, and Archibald Forbes regarded his magnetism and genius for war equal to that of Skobeleff. He wrote his "Personal Memoirs," which appeared in two volumes after his death. James E. Kelly made a fine statuette of him, known as "Sheridan's Ride," and he has been otherwise fittingly honored.

SHERIDAN, Richard Brinsley Butler, orator and dramatist, born in Dublin, Ireland, Sept. 30, 1751; died July 7, 1816. He was a son of Thomas Sheridan (1721-1788), an efficient actor and later teacher of elocution, and received his early education in a school of his native town. In 1763 he was sent to study at Harrow, where he joined a schoolmate in writing a farce entitled "Jupiter." In 1773 he married Miss Linley, an accomplished musician of Bath, and shortly after settled in London to engage in literary work. He soon became part proprietor of the Drury Lane Theater, where his "The Rivals" and the "School for Scandal" attracted wide attention. In 1780 he entered parliament for Stafford. He became undersecretary for foreign affairs in 1782, and the following year secretary of the treasury. His speeches in parliament are regarded among the finest delivered in that body, being noted for their oratorical style and persuasive reasoning. The most noted were the three great orations delivered while the proposal to impeach Warren Hastings was pending. In 1794 he made a remarkable address on the "French Revolution," which has been widely read. His parliamentary career ended in 1812, after serving in that body thirty-two years, but when retiring from public service his property had been spent and he had lost his former friends. At least a part of his financial difficulties was due to extravagant living, and he suffered a considerable loss when Drury Lane Theater burned in 1809, and at one time was imprisoned for debt. He was buried in Westminster Abbey.

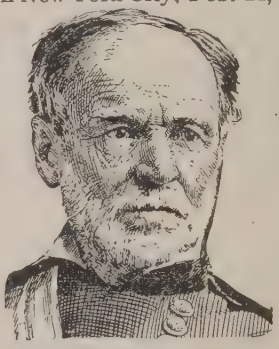
SHERMAN, a city in Texas, county seat of Grayson county, sixty-five miles north of Dallas and twelve miles south of the Red River. It is surrounded by a rich cotton, grain, and live-stock country, has important railroad facilities, and in its vicinity are valuable deposits of coal. The manufactures include flour, cotton-seed oil, cordage, furniture, tobacco products, vehicles, ice, brooms, machinery, and farming implements. It has electric lights and street railways, public waterworks, pavements, and numerous schools and churches. Sherman is the seat of Austin College, Sherman Institute, North Texas Female College, St. Joseph's Acad-

emy, and several other institutions of learning. It has a fine courthouse built of brick and stone. Population, 1900, 10,243.

SHERMAN, John, statesman, born in Lancaster, Ohio, May 10, 1823; died Oct. 22, 1900. His father died in 1829, leaving a large family, and he was soon after adopted by a relative who resided at Mount Vernon. A sister provided the means for his education in a school at Lancaster, and he afterward studied law at Mansfield in the office of his brother, C. T. Sherman. In 1844 he obtained admission to the bar and entered upon a successful practice in Mansfield, where he married a daughter of James Stewart in 1848. In 1854 he was elected to congress as a candidate of the free-soil party, and he was reëlected two succeeding terms. He served on a number of important committees and attained recognition as one of the foremost members in the lower house. He was again elected to congress in 1860, but was chosen to the United States senate in 1861, serving continuously in that body until in March, 1877, when he was appointed secretary of the treasury by President Hayes, a position he held until the close of that administration, in 1881. In the latter year he was again elected to the senate and reëlected in 1887 and in 1893. President McKinley appointed him secretary of state in 1897, a position he held until in April, 1898, when he retired from public life and was succeeded by William R. Day in the cabinet. The name of John Sherman is inseparably connected with the history of American finance and politics. Besides being prominent as a speaker on the floor of congress and in committees, he exercised a wide influence on the policy of the government. One of the most noted financial measures enacted while he was secretary of the treasury is the resumption of specie payments in 1897. He wrote "Recollections of Forty Years in the House, Senate, and Cabinet," and published "Selected Speeches and Reports on Finance and Taxation, 1859-1878."

SHERMAN, Roger, statesman and signer of the Declaration of Independence, born in Newton, Mass., April 19, 1721; died in New Haven, Conn., July 23, 1793. He learned the trade of a shoemaker while a boy and followed it as a business until 1743, when he entered a store at New Milford, Conn., and was chosen county surveyor in 1745. After studying law, he was admitted to the bar in 1754, and became a member of the legislature and later a judge of common pleas. In 1774 he was selected a member of the continental congress, where he served on the committee to draft a declaration of independence, and subsequently aided in framing the articles of confederation and the federal constitution. He was elected to the senate in 1791, but died two years later. Other positions of importance held by him include membership in the Connecticut legislature for nineteen years, treasurer of Yale University in 1766-76, and mayor of New Haven in 1784-93.

SHERMAN, William Tecumseh, distinguished general, born in Lancaster, Ohio, Feb. 8, 1820; died in New York City, Feb. 14, 1891. He was a brother of John Sherman, and on the death of his father, in 1829, was adopted by Thomas Ewing, who provided for his education in the Lancaster Academy and afterward procured his appointment as cadet at the West Point Military Academy. In 1840 he graduated the sixth in rank of his class, and secured an appointment to the artillery. He served against the Seminoles in Florida in 1840-42, was stationed at Fort Moultrie, South Carolina, till 1846, and subsequently served as adjutant-general during the Mexican War. He married Ellen Boyle Ewing, daughter of Thomas Ewing, in 1850, and three years later resigned his commission in the army to become manager of a bank in San Francisco. Sherman, having begun the study of law in 1843, was ultimately admitted to the bar. In 1858 he began the practice of law in Leavenworth, Kansas, but was made superintendent of the military academy at Alexandria, Louisiana, the following year. When that state seceded from the Union, he promptly resigned and was appointed colonel in the United States army with a command under General McDowell.



WILLIAM T. SHERMAN.

Sherman had command of a brigade in the first battle of Bull Run. He was made brigadier-general soon after, and was assigned to the department of the Cumberland, of which he was given command on Oct. 8, 1861. Sherman was among the first to represent to the secretary of war that it was necessary to secure 60,000 men for the defense of Kentucky and 200,000 to conduct successful operations against the enemy, but many held the view that the war would be of short duration and characterized his judgment as unsound. General Buell superseded him in November, and he was ordered to report to General Halleck, under whom he received command of a camp of instruction near St. Louis. Later he formed a division for himself, and in the battle of Shiloh, on April 6, 1862, won favorable mention by Grant and Halleck for distinguished services. He was made major-general of volunteers soon after, and exercised a large influence in the operations under Grant around Vicksburg and Memphis. The first attack on Vicksburg was made in December,

1862, but Grant's supplies were captured at Holly Springs, thus giving the enemy time to reinforce the city, and Sherman found it impossible to successfully assail that stronghold with the inadequate force at his disposal. However, he was joined by General McClernand in storming Arkansas Post, where they captured 7,000 prisoners, and in 1863 he bore the brunt of the battle at Chattanooga.

When Grant became commander-in-chief of the forces in March, 1864, Sherman was put in command of the military division of the Mississippi, and was ordered to advance upon Atlanta against Gen. Joseph E. Johnston. That stronghold was occupied on Sept. 1, but involved a month and a half of fighting, including the battles of Dalton, Resaca, New Hope Church, and Kenesaw Mountain. Soon after he started upon his famous march to the sea with 70,000 men, and after defeating the enemy at Fort McAllister on Dec. 21, entered Savannah. A month later he started on his march northward through the Carolinas to support General Grant, but on hearing the news of the surrender of General Lee, General Johnston sent to Sherman for terms of peace, and surrendered at Durham's Station, North Carolina, on April 26, 1865. Sherman was given command of the division of the Mississippi after the war. He was made lieutenant-general in 1866, and President Grant, in 1869, raised him to the rank of general, with headquarters in Washington. He made a tour of Europe in 1871-72, and was placed on the retired list on Feb. 8, 1884. Though given numerous opportunities to fill political offices, he constantly refused. He ranks among the most eminent military leaders of America, being characterized by promptness in execution and fearlessness in confronting danger, and yet strengthened by remarkable soundness of judgment. His influence over the soldiers was always for the common good, and his popularity among those subordinate to him was conceded from the first. He wrote "Personal Memoirs."

SHERRY. See **Wine.**

SHERWOOD FOREST, a hilly region of England, in Nottinghamshire. Formerly fine forests covered the region, which is about twenty-five miles long and seven miles wide, but it is now largely cleared and occupied by farms, gardens, and pastures. Sherwood Forest is the region where Robin Hood and his followers enacted many marauding exploits.

SHETLAND, an island group north of Scotland, situated about fifty miles northeast of the Orkney Islands, and forming a county of Scotland. About one hundred islands are included in the group. All are more or less rocky, with precipitous shores in many places. They have an area of 325 square miles. The three chief islands are Mainland, Yell, and Unst, and besides them twenty-six others are inhabited. The total population of the group is 28,695. Lerwick is the principal town and seaport. It has the public offices, law courts, a custom-house, and a population of 4,154. The coasts are rocky, precipitous, and remarkably irregular, and there is a total absence of native timber. Fishing is the principal industry, but there are considerable interests in rearing cattle, horses, sheep, and poultry. The soil products include oats, turnips, hay, potatoes, and various garden vegetables. Among the chief exports are salted fish, sheep, eggs, and cattle. The islands are particularly famous for the rearing of Shetland ponies. There are valuable deposits of iron, copper, sulphur, and sandstone. The manufactures include woolen goods, fishing supplies, fish oil, cured fish, and utensils. These islands were known to the Romans as the Ultima Thule, and long formed a possession of Scandinavia. The people still speak a dialect largely mixed with Norse words. They are a sober, intelligent and industrious class. The climate of these islands is moist in summer, but dry and extremely cold in winter, the winter day being only a few hours in length.

SHIBBOLETH (shĭb'bō-lĕth), a test word mentioned in Judges xii, 6. It was used as a criterion by Jephthah and the Gileadites to test the Ephraimites after their victory over the latter. The Ephraimites were easily known by omitting the sound of sh, and pronouncing the word sibboleth instead. It is still used in several modern tongues to test the speech and manners of certain social classes.

SHIELDS (shēldz), **South,** a city in England, at the mouth of the Tyne River, eight miles northeast of Newcastle-on-the-Tyne. Opposite the city are North Shields and Tynemouth, with which it is connected by steam-ferry. It has excellent railroad and steamboat facilities, and an extensive trade in coal, earthenware, and food-stuffs. The manufactures include cordage, sailing vessels, anchors, earthenware, chemicals, glass, steamboilers, and machinery. Its excellent harbor is protected by an extensive breakwater, and there are large docks for repairing ships. The city has a large number of excellent churches and educational institutions, and is supplied with pavements, libraries, hospitals, parks, and rapid transit. A military post was established on its site by the Romans, but its prosperity dates from the development of its salt works in 1489, and its modern enterprise from the building of railroads in the middle of the last century. Population, 78,220.

SHILOH (shī'lō), an ancient town of Palestine, in the region occupied by the tribe of Ephraim. It was the sanctuary of the ark in the priesthood of Eli and Samuel, when it formed a religious center of influence. The Philistines destroyed it after the disastrous battle of Ebenezer. Its site is thought to be occupied by the modern village of Seilun.

SHILOH, Battle of, an important engagement of the Civil War, so named from a church about two miles west of Pittsburg Landing, on the Tennessee River. The Union army of 40,000 men was commanded by Gen. Grant, and the Confederate of 45,000 by Generals Johnston and Beauregard. General Grant reached Pittsburg Landing with his army and on April 6 was attacked by the Confederates, the latter driving divisions of the Union army under General Sherman and McClernand back with great loss, but in the afternoon General Johnston was killed and the Confederates retreated. General Buell joined Grant with 7,000 men the next morning, when the Union army assumed the offensive, and in the afternoon began to rout the Confederates and force them to make a final retreat. The Federals lost about 13,500, and the Confederates about 14,000. This engagement is also called the battle of Pittsburg Landing.

SHINTOISM (shĭn'tō-ĭzm), one of the chief religions of Japan, and formerly the universal religion of the people. In 552 A. D. Buddhism was introduced from Corea, and the two now form the religions of the Japanese. Shintoism is primarily concerned with the worship of nature, but since its first introduction it has partaken largely of a form of hero and ancestor worship. The mikado is regarded the direct descendant and representative of the sun-goddess Amaterasu. Worship implies implicit obedience to him.

SHIP, the name applied in a restricted sense to a large vessel with bowsprit and three masts, each of which carries square

SHIP.

sails, but in an extended sense to vessels adapted for navigation, including all kinds except boats. The restricted application of the term was formerly observed with marked care, but its use has been modified by the increase of size in sailing vessels and the enlarged use of steam power as a propelling agency. There are many uses to which ships are successfully applied, and the construction and name vary according to the purpose they are to serve; thus have arisen such terms as transports, barks, luggers, schooners, sloops, brigs, galleys, xebecs, merchantmen, man-of-war ships, and many others. The bowsprit is a spar projecting forward and usually slightly upward from the bow of the vessel, resting upon the stem and apron, and supporting the boom. The masts are named in consecutive order from the fore, including the fore-mast, the main-mast, and the mizzen-mast; and the fourth, if present, is called the jigger-mast. Each mast is made up of a lower-mast, a top-mast and a gallant-mast; and the main sails carried on each of the masts are named according to the particular one to which they belong. The brig has two masts with square sails and is smaller than a ship, while the schooner has two or three masts, and the sloop only one. A cutter is formed quite like a schooner, and a barkentine combines the features of a schooner and a ship proper. The different parts of a ship include the sails, made of stout fabric and designed to propel the vessel; the rigging, ropes, and chains; the spars, including the timber above the hull; and the hull, the part that glides in the water. There are three general divisions of the hull: the bow or forward part, the waist or middle part, and the stern or after part. The raised sides are bulwarks, and the part open to the sky is the upper deck.

Shipbuilding dates from remote antiquity, and it is probable that the construction of vessels to move on water was first suggested by floating logs in rivers and lakes. Later rafts were made by fixing planks and spars together to form a floating surface, thus constituting a strong, buoyant support for a cargo, and later large tree-trunks were hollowed out and sharpened at the ends to form primitive canoes. It is known that two modes of propulsion, those by oars and sails, are practically as old as the early stages of constructing sailing vessels. The Mediterranean Sea is the noted scene of much activity by ancient nations in the construction and use of vessels of different kinds, and in shipbuilding these nations made use of both means of propulsion, as in the galleys and triremes. However, as barbarism overthrew the ancient civilizations, it materially retarded shipbuilding. Consequently it became necessary for the people of mediæval times to draw largely upon their own resources in planning and building ships. After the decline of Rome no people possessed stronger galleys and more fearless sailors than did the Norsemen, who cruised along the Atlantic coasts of Europe and Africa and penetrated all parts of the Mediterranean.

The discovery of the compass led to the introduction of better methods of navigation. This circumstance and the establishment of sailing routes to India and America were epoch-making events in the construction and use of vessels fitted to brave the high seas in regions far from land. Spain was

long the foremost naval power and marine nation, but it met an active competitor in Holland in the 16th century, and France, Denmark, and England soon made rapid strides toward building powerful navies. Shipbuilding was one of the foremost branches of manufacturing industry in the colonial period of America, especially in the New England states. The first American ship was built in 1607 near the mouth of the Kennebec River, and called the Virginia, and in 1698 a law was enacted that all vessels of more than thirty tons should be built under the supervision of a shipwright. American ships began to enter into active competition with those of Europe in the early part of the 18th century, American manufacture being facilitated by the cheapness of large and valuable timber. Consequently sailing vessels long formed a chief product of manufacture for export.

Shipbuilding was modified remarkably after the introduction of steam as a propelling force. The first vessel to apply steam as the motive power was built by Robert Fulton in 1807, and named the Clermont, which plied successfully on the Hudson River. In 1811 was completed the first steam vessel of European construction, the Comet. It was the earliest steam vessel to be constructed on a plan fitted for service on the sea. Captain Ericsson in 1837 completed a small steam vessel driven by a screw, with which he sailed successfully off the coast of England, by which an epoch was marked in shipbuilding. The Great Western was the first vessel to commence regular Atlantic passage under steam, in 1838, but its propelling power was by paddles. Soon after wood began to give way to iron as a material in construction, and then to steel, and the screw began to be generally adopted in 1845, its importance being recognized by efficient service in several ships-of-war. It has been found that an iron vessel is lighter than one of the same size built of wood. Besides, iron is much more durable and of greater strength, and can be bent into the required shape.

All the largest vessels are now propelled by steam, and, in fact, sail-ships are practically discarded from the important freight and passenger service. The reason is to be found in the circumstance that a steam-propelled vessel can make material progress in spite of unfavorable wind, and its capacity for rapid sailing is greatly in excess under all circumstances. The largest steam-propelled vessels are very large, having a capacity up to 8,000 tons, with engines of about 12,000 horse-power, and in many cases four masts are added to further facilitate progress in sailing. An immense vessel called the Great Eastern was built in England in 1852, having a length of 692 feet. It was the largest vessel ever built, but it did not prove practical. Shipbuilding in the United States has become an important industry, and the vessels produced are among the finest and best in the world. It is particularly noteworthy that the American yards contain especially educated laborers, thus combining the best skill obtainable with the vast natural resources at the command of American manufacturers. Great Britain leads all other countries in the annual output of new sailing vessels, while the United States takes second rank and Germany third. Other nations engaged largely in the art of shipbuilding take rank in the following order: Holland, Italy, Denmark, Norway, France, Belgium, and Sweden. See **Steamboat**.

SHIPTON, Mother, a reputed prophetess, born in Yorkshire, England, in July, 1488. In 1645 a collection of her prophecies was published, and in 1660 she was alluded to in a comedy. The most famous of her prophecies is the one made public in 1641, which indicated the fate of Wolsey and Lord Percey, foretelling that the former would not live to reach York. It is considered that this prophecy was fulfilled, since he was arrested at Cawood shortly before his installation as archbishop of York. A set of rhymes published in 1862 was formerly assigned to her, which foretold that the end of the world would occur in 1881, but they were written by Charles Hindley.

SHIRAS, George, American jurist, born in Pittsburg, Penn., Jan. 26, 1832. He completed the course of study at Yale University by graduation in 1853, and after studying law in the Yale Law School was admitted to the Pennsylvania bar. He practiced successfully in Pittsburg, being associated with many important cases, and in 1892 was appointed an associate justice of the United States Supreme Court by President Harrison. Yale University granted him the degree of LL. D. in 1883.

SHIRAZ (shē'räz), a city in Persia, capital of the province of Farsistan, 164 miles northeast of Bushire. It occupies an elevated site 4,500 feet above sea-level, and is surrounded by magnificent orchards, vineyards, cypress groves, and rose gardens. The city dates from 697 A. D., when it was founded on a favorite site as a resort for Persian princes, and through all the succeeding centuries its fame has been proclaimed in Persian poetry. A wall four miles in length surrounds the city, enclosing many beautiful mosques, palaces, and institutions of learning. It has manufactures of wine, rosewater, cutlery, silk, cotton and woolen goods, firearms, glass, and earthenware. Its trade is extensive and it is visited by many large caravans. Tamerlane captured Shiraz in 1387. In 1812 and 1853 it suffered greatly by destructive earthquakes, fully 12,000 people losing their lives. Among the eminent poets and scholars who claim it as their birthplace are Hafiz, Sibuyah, and Saadi. The tombs of Hafiz and Saadi are in its neighborhood, and thirty-five miles

northeast are the ruins of the ancient city of Persepolis, which was occupied as the capital of Persia under Xerxes and Darius. Alexander the Great destroyed Persepolis, but remains of their palaces may still be seen. The population of Shiraz is estimated at 31,500.

SHISHAK (shī'shăk), the name of a number of monarchs of Egypt, classed in the twenty-second or Bubastite dynasty, and thought to have been of Semitic descent. Shishak I. is mentioned in the inscriptions placed on the portico of the great temple of Karnak by the Bubastite dynasty, and on several statues to the goddess Pasht. When Solomon pursued Jeroboam, the latter fled to Shishak for protection, but after the death of Solomon he became sovereign of the newly formed kingdom of Israel, which was separated from Judah at that time, and Rehoboam was made king of the latter. It is evident from monumental inscriptions that Shishak marched to Jerusalem against Rehoboam in the fifth year of the latter's reign, and after taking the city carried the treasures of the temple to Egypt. Scenes from this conquest of Jerusalem are recorded on the monuments of Karnak.

SHODDY. See Rags.

SHOES, articles of wear for the feet, made mostly of leather, but also of various other materials. The Egyptians, Greeks, and other ancient peoples wore a rudimentary shoe, consisting mainly of a sole held on the feet by straps. Any one of this class of footwear is known as a sandal. For centuries the Egyptians wove a kind of shoes with strips of papyrus, which they painted and ornamented with remarkable skill. It was customary to wear the sandal in Rome, but later coverings were provided for the whole foot. Subsequently the Roman footwear was made more durable for army service by protecting the soles with nails and metallic plates. The manufacture of shoes is an important industry in the United States, and those produced are manufactured almost exclusively of leather. They are largely made by machines, but the best kinds are hand-sewed. In shoemaking it is necessary to use several kinds of machines, some fitted to stitch the sole and others designed to sew the upper parts. Ingeniously constructed machines are employed for pegging the soles. The American Indians make buckskin shoes called moccasins.

Boots are a modified form of shoes, having the upper leathers lengthened to form a protection for a part of the leg, while slippers are a low form used largely for indoor wear. In Holland, France, and other countries of Europe shoes are made to some extent of wood, in Japan of paper and plaited straw, and in many tropical countries of plaited grass and hemp. It would be difficult to enumerate all the different kinds of shoes worn, since the art of dressing the feet for comfort, convenience, and fashion is quite as notional as the apparel fitted for other parts of the body. In China the foot of the females of certain classes is compressed from early youth, and the shoe worn by the adult of those classes is only five or six inches long. Among the remarkable matters of interest to be observed in the shoe trade is the fact that there has been a wonderful revolution in the art of making and repairing shoes, the factory-made product having almost entirely driven the boots and shoes of the hand manufacturers from the market.

SHORTHAND, or Phonography, any system of handwriting that reduces the number of muscular movements required to keep pace with uttered speech. It differs from longhand in that characters are used to represent words, parts of words, or sounds instead of all the elementary sounds of words. The art is of great antiquity, having been employed by the ancient Greeks and Romans, both to secure brevity and secrecy, but all traces of ancient systems were lost in the Middle Ages. There are properly four distinctively different systems, including phonography, or sound writing; stenography, or compressed writing; tachygraphy, or quick writing; and brachygraphy, or short writing. The underlying principles of these processes have led to the publication of fully 300 different methods or systems, all possessing more or less value in writing the various languages now spoken. Timothy Bright published the first modern system of shorthand in 1588, which made use of marks instead of letters of the alphabet. The system published by Peter Dales in 1590 used characters to denote words. These were superseded in 1602 by a system of shorthand devised by John Willis, who adopted arbitrary signs, thus introducing to some extent the elements employed by the more practical systems now in use.

Isaac Pitman published his work on shorthand in 1837, and was the first to use the word phonography. His system is based on the sounds of the English language. It rapidly superseded other systems and was adapted to be employed in many foreign languages, among them the German, Dutch, French, Italian, Japanese, Spanish, and many others. He used forty-one letters to represent the elementary sounds, six long and six short vowels, five diphthongs, and twenty-four consonants. Double and treble consonants for abbreviating the writing were made by hooks and circles at the beginning and end of the consonant strokes. This system rapidly revolutionized shorthand writing, being well adapted to secure legibility as well as the greatest degree of brevity. Since its publication many other systems have been either modified from Pitman's or originated, but the Pitman system is still a standard. Shorthand is now taught in all the business and commercial schools, and has found a place in many of the secondary,

special, and public and private high schools. It is employed largely in reporting speeches, in newspaper and court reporting, and in general office work. Among the leading systems in America are the Pitman, Graham, cross-electro, and eclectic. The number of words and syllables uttered by a speaker in a specified time varies largely in individuals and in different languages. Usually from sixty to 175 words per minute may be taken to represent the extremes in the English language, while the average number of words is about one hundred per minute. A skillful reporter is able to take fully 150 words in a minute, and usually transcribes that number on the typewriter in three minutes, thus averaging about fifty words per minute in the completed manuscript.

SHOSHONE FALLS (shō-shō'nē), a remarkable cataract in Idaho, on the Snake River. The current is about 950 feet wide and falls in the form of a semi-circle, its height being about 210 feet, exceeding the Niagara Falls forty feet. Precipitous walls of rock fully 1,000 feet high form barriers on both sides of the river, and four miles up the river are the Little Shoshone Falls, thus giving the region a remarkably interesting aspect. See **Snake River**.

SHOSHONES (shō-shōn'nēz), or **Snakes**, an American Indian tribe, formerly resident in the region now occupied by Utah, Idaho, and Nevada. They include a number of bands, among them the Buffalo Eaters and White Knives. Lewis and Clarke first came in contact with them while penetrating the regions beyond the Rocky Mountains in 1805, and found them a peaceful class of natives. The advancement of settlers brought on hostilities near the Humboldt River and Great Salt Lake in 1849, and these were succeeded by battles in 1863. A treaty was made with them in 1867, when the government assigned them land in various parts of Nevada, Utah, Idaho, and Wyoming. They include about 5,750 at the present time, numbering among their membership many of considerable advancement in education and the arts. Christian missions have been opened among them with some degree of success.

SHOT, the general name applied to pellets and bullets used in firearms of various kinds. Round stones were first employed for shot when powder came into use, but it was soon found that a regularly formed ball made of metal provided greater convenience and was far more effective for all purposes, even in the rude guns then made. Solid shot is not used as extensively as formerly, but hollow projectiles are employed instead. The size of the shot varies materially with the kind of guns from which it is to be thrown, ranging from very small pellets to projectiles weighing about a ton. The material used is cast iron or steel, and there are differently prepared missiles for various purposes, such as canister, grape, shrapnel, bar, and numerous others. Canister shot is made up of small iron or lead balls placed in a sheet-iron can, and is designed to burst on leaving the gun. Grape-shot is made of a number of small cast-iron balls, so adjusted that they may be thrown in a body from the gun. Shrapnel shot is made by placing a number of musket balls in a cast-iron shell and filling the intervening spaces with sulphur or resin. This material is added to harden and form the balls into a solid mass, and powder is afterward placed within to burst the shell on striking the object against which the shot is thrown. Bar shot is employed to destroy the rigging of a ship. It consists of discs of iron joined by a bar, but a chain is sometimes used for a like purpose.

Sportsmen use pellets of lead of various sizes, this depending upon the kind of game hunted. The finer grades are more serviceable for small animals, as they are less likely to damage the flesh, while larger classes are needed to kill more bulky game, such as geese and brants. Shot of this kind is made by melting the lead and dropping it through sieves from a high tower into water. The dimension of the shot depends on the size of the hole of the sieve or colander through which the metal passes. As they fall through the air they become cooled and hardened. Shot towers vary in height from one hundred to 150 feet. After dropping the shot from the top, it is separated according to the different sizes and polished. A newer process is to mold the metal by running it in a molten state into a trough and allowing it to drop through little holes into molds, which discard the pellets as soon as formed and drop them into a bed of graphite.

SHOWERS OF FISHES, a peculiar occurrence sometimes seen in various regions, particularly in tropical latitudes. Among the instances of this kind is a shower that fell near Merthyr-Tydvil in Wales, where small fishes were found over an area of several square miles shortly after a rainstorm. Another instance occurred in the Isle of Mull, in which herrings were found 500 yards from the sea, and when first seen they were still alive. This phenomenon is due to the circumstance that large columns of water are often taken up by whirlwinds and carried at a considerable elevation some distance from the sea, where the water falls to the ground accompanied by the fishes taken up from the sea. In tropical countries many bodies of water dry up, and fish and other living forms remain alive at some distance below the surface of the dried mud, but revive fully when the basin is again filled with water. This explanation accounts for the rapid population of these water beds with fish, instead of falling from the clouds, as some suppose.

SHREVEPORT (shrēv'pōrt), a city in

Louisiana, capital of Caddo parish, on the Red River, 300 miles northwest of Baton Rouge. It is an important railroad center, and has an extensive trade in cotton, cattle, fruits, and agricultural products. The manufactures include cotton goods, cigars, ice, lumber products, cotton-seed oil, carriages, hardware, and machinery. Among the notable buildings are the United States Marine Hospital, the State Charity Hospital, the cotton exchange, the opera house, and numerous churches, schools, and several academies. The city is supplied with gas and electric lights, electric street railways, street pavements, waterworks, and other municipal facilities. Population, 1900, 16,013.

SHREW (shrụ), a genus of animals resembling the mouse and the dormouse, but distinguished from them in having soft fur and an elongated muzzle. A large number of species have been enumerated, of which the common shrew is the best known. It is about the size of a mouse, but has a

WATER SHREW.

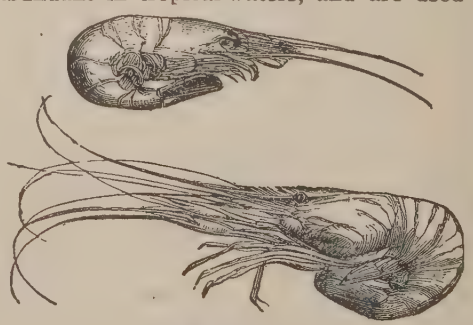
prolonged muzzle, small eyes, and a four-sided tail. The ears are short and the color is brownish-black. The food consists of insects, worms, and the smaller mollusks. These animals come out in search of food at night, and are noted for their tendency to fight, the stronger often killing and eating their weaker opponents. The shrew-mole of North America includes several species and is very nearly allied to the moles. Several varieties are common to Europe, all more or less similar to the American species, but differing from them in various respects, especially in being larger and having longer legs. The water shrew is larger than the American; its snout is quite pointed, and its home is on the banks of streams and lakes, often entering the water. Some species burrow in the fields and gardens in search of worms; this is particularly true of the American shrew-mole.

SHRIKE, a genus of birds of the insessorial family, and widely distributed in America, Eurasia, and other continents. The food consists of insects, frogs, mice, and small birds, receiving from their habit of killing other birds the name of butcher-bird. The great American shrike is about ten inches long. It has a grayish color with whitish markings, and is able to imitate the voice of other birds. About thirty other

AMERICAN SHRIKE.

American species have been described, some of which are native to South America. The red-backed shrike of Europe is about eight inches long, and the great gray shrike of Asia and North America approaches the thrush in size.

SHRIMP, an extensive genus of ten-footed crustaceans. They resemble the lobster and crawfish, but differ from them in having an elongated, tapering, and arched form. The claws are small, the rostrum is short, and the tail is long and fan-like. Their whole structure is delicate, many species resembling in hue the objects near which they develop, thus escaping easy observation. They burrow in the sand by a peculiar motion when alarmed, or seek safety by hiding under rocks and pebbles. The size is from two to three inches in length. Shrimps are a favorite food in many European countries, and on boiling assume a brownish color. They are widely distributed, but are most abundant in tropical waters, and are used



COMMON SHRIMPS.

chiefly as bait for fishing in the United States. The common shrimp is caught by large nets with a semi-circular mouth.

SHROVE TIDE, the days immediately preceding Ash Wednesday, at which time Catholics were accustomed to confess their sins as a preparation for Lent. Shrove Tuesday was made a season for feasting and merriment, and is still called mardi gras by the French.